

# OPHTHALMOLOGY

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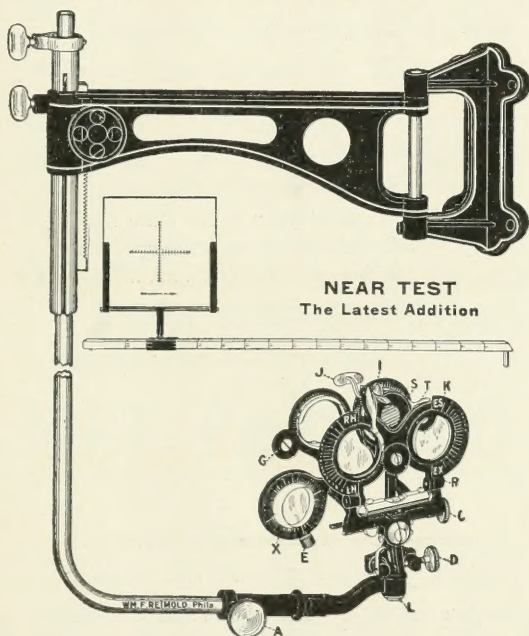
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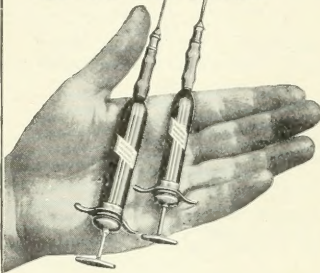
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# OPHTHALMOLOGY

ESSAYS, ABSTRACTS AND REVIEWS.

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OCTOBER, 1909.

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## *Original Articles*

### THE REQUIREMENTS AND THE REGULATION OF SIGNALLING BY COLOR.\*

CHARLES A. OLIVER, A. M., M. D.,

PHILADELPHIA, PENNSYLVANIA.

(Abstract.)

(The importance of accurate color-vision in railway service, naval and marine transport, army signalling, and geodetic survey-work. Methods of ordinary clinical and expert recognition. Necessity for testing color-vision at distances in situations, and under conditions which are safe for life and property: devices for the determination of the same. Need for regulation of color-signals, and plan for those used in maritime service. Request for International Commission of ophthalmic and other experts for decision as to methods, etc., and plea for governmental control of the entire question.)

At the general meeting of the American Philosophical Society, held in Philadelphia four years ago, I read the following plea:<sup>1</sup>

"When it is realized how important becomes normal perception of color in situations in which accurate color-vision is one of the main requisites or is the sole determining factor for the safety of lives and for the protection of property, it will be at once understood that definite rules for the obtainance of color-material, for the construction of test and governing objects, and for the choice of standards of necessary color-sense, should be all placed under the supervision of a controlling body from whom all requisite laws must proceed, all regulations exercised, and all appeals from enforcement made.

"Arbitrary selection of color-material, even though scientifically and properly obtained primarily; voluntary employment

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\*Read before the Eleventh International Congress of Ophthalmology which met in Naples, Italy, in April, 1909. (Vide "Transactions" of same.)

1. See article numbered 12, in second foot-note.



of necessarily many empirical—and hence oftentimes, imperfect—methods; and the existence of multitudinous controlling corporate bodies for the adjudication of uncertainties, neglect, and intentional wilful acts—must all exist—as they practically now do—just as long as no steps are taken to place the entire question under the supervision of national governing boards.

“Railway service, no matter what the form of motor may be or in what manner the necessary duties are performed, is mainly governed during actual work by the proper and the ready recognition of color-signals which are placed sufficiently distant for safety to those for whom the signaling is intended; naval and marine transport throughout the world is mostly accomplished amid the many vicissitudes of atmospheric and hydrostatic change, by quick and certain detections of chosen peculiarities of color situated at safe points of relative signification; and army signaling and geodetic survey work in their ever varying degrees of necessity of occasion, are largely dependent for success upon both aided and unaided color-vision: These conditions granted, it will be at once seen how vast the field of color employment is, how necessary that proper material shall be correctly used, and how important it becomes that the performance of the actual work shall be limited to those who possess normal color vision.”

For many years my attention has been given to these questions, resulting in a series of communications to various societies and a number of articles published in different general and special journals.<sup>2</sup>

2. Among these may be mentioned:

1. “Preliminary Paper on the Determination of a Standard of Color-Sense for Reflected Color by Daylight; with a Graphic Description of the Individual Limits and Average Results of Sixteen Cases.” *Archives of Ophthalmology*, Vol. XI., No. 1, March, 1882.

2. “A New Series of Wools for the Scientific Detection of Subnormal Color-Perception.” *Transactions of the American Ophthalmological Society*, 1886.

3. “Subjective After-Color (Complementary Color).” *Proceedings of the American Philosophical Society*, October 1, 1886.

4. “Description of a Series of Tests for the Detection and Determination of Subnormal Color Perception (Color-Blindness). Designed for Use in Railway Service.” *Transactions of the American Ophthalmological Society*, 1888.

5. “A Series of Wools for the Ready Detection of ‘Color-Blindness.’” *The Medical News*, September 2, 1893; and *Transactions of the American Ophthalmological Society*, 1893.

6. “Some of the Inefficiencies of the Methods Ordinarily Employed by Railway Surgeons for the Detection of Subnormal Color-Perception (Color-Blindness).” *Annals of Ophthalmology and Otology*, Vol. V., No. 4, October, 1896.

7. “Color Perception: Normal and Subnormal.” *A Reference Handbook of the Medical Sciences*, Vol. III., 1901.

As I said in 1901<sup>3</sup>, for practical recognition of color perception, there have been many devices. These plans have been based upon three well-known methods: First, direct comparison of pigment colors; second, direct comparison of spectral colors; and third, study of subjective simultaneous-color and after-color (complementary color).

The first, which is the most important, and the one which is in common use for ordinary clinical purposes to-day, is best known by the wools of Holmgren that were borrowed from the papers of Seebeck and the worsteds of Wilson. Modified in all manners of way by assortments of fixed colors that have been arbitrarily arranged upon cards, cones, discs, spools, sticks, and other articles, it has suffered the most varied of vicissitudes, only to be brought back, in this and some other countries, to the original plan of loose-wool selection, which was strenuously fought for by both Wilson and Holmgren.

The second method (direct comparison of spectral color) unfortunately, cannot be brought into every-day employment as a general test for the quick detection of lowered color sense, although it can be made to serve an useful purpose in cases requiring more than ordinary observation,—as among persons under judicial action. The apparatus is expensive; its mechanism is complicated and liable to become disarranged; both the examiner and the candidate must possess the necessary intelligence to handle the instrument; and the dealing with spectral colors—which are not the ones that both the examiner and the candidate are brought in daily association with during work—are some of the reasons why this plan must be relegated to the determination of a few selected cases.

The third plan is practically useless. Much time and energy have been expended upon it, and contrivances of all kinds to show simultaneous and successive contrast colors have been devised. Unfortunately, in this series of experiments, vague subjective colors are dealt with; uncertain color intensities, and

8. "A Modification of the Abney Pellet Test for the Ready Detection of Central Scotomata." *"Annals of Ophthalmology,"* July, 1902.

9. "A Case Illustrating the Inadequacies of the Present Methods for the Recognition of Distant Color Signals: with a Series of Brief Plans for Remedying the Same." *"Annals of Ophthalmology,"* April, 1904.

10. "Regulation of Color Signals in Marine and Naval Service." *"Proceedings of the American Philosophical Society,"* Vol. XLIII, No. 176.

11. "Improved Series of Wools for the Detection of Subnormal Color-Perception." *"Ophthalmology,"* January, 1905.

12. "A Plea for Governmental Supervision of Posts Necessitating Normal Perception of Color." *"Proceedings of the American Philosophical Society,"* Vol. XLIX., 1905.

3. See articles numbered 2, 5, and 7, in second foot-note.

in fact, instantaneous changeabilities of color-vibration are used; and the adjustment of instrumental technique are frequently uncertain and misleading: In addition, the examinee is required to compare the subjective colors with some known series of colors such as wools and papers, which might as well have been employed primarily.

For general clinical purposes, some scientifically arranged collection of loose wools is by far the best, the cheapest, and the most easily handled, that can be employed for ordinary testing: such a collection of wools I have devised and are in use.<sup>4</sup>

For the study of the color-sense in railway and marine service, resource must be had to another plan. This, which I have pointed out<sup>5</sup>, consists in placing the candidate in the actual position in which he is afterwards expected to discern properly the colors that are employed for signaling purposes. Miniature lanterns containing ungauged arbitrary color-differences, held fifteen or twenty feet away from the subject, are most uncertain. The candidate must be tested with adaptations of apparatus that are as nearly as possible like those which are used under ordinary circumstances, *i. e.*, when he is employed at work: The testing must be done under the actual conditions which exist while the candidate's color-sense is officially protecting life and property.

Examination of such candidates at safe distances becomes a necessity. The determination of the color-sense along the visual line, or what is generally known as foveal vision, is the main requisite, this being practically so when it is considered that in the acquired types of color-defects produced by the introduction of toxic agents, such as tobacco and alcohol, into the system, it is in the central area of the visual field that color becomes diminished in saturation or is lost. The findings at one or even two meters' distance, are, in this character of cases, worse than useless: they are dangerous<sup>6</sup>. As just stated, the degree and the amount of color-sense must be known when the organs of vision are placed under the same circumstances as they are when it becomes necessary that they are to be the sole means for the avoidance of threatened accident or the prevention of imminent danger. Laden engines, for example, moving with the rapidity of twenty to thirty-five meters each

4. See articles numbered 2, 5, and 11, in second foot-note.

5. See article numbered 4, in second foot-note.



second, or so-called traction trolleys which run at such high rates of speed, would be propelled into destruction long before any engineer with "chronic myopia"<sup>7</sup> could check their speed. The test for the recognition of the customarily used signal must be made at a distance which is sufficient for proper control of the moving mass: It must be known that the candidate for such work is able to recognize color at a safe distance. To accomplish this purpose, the candidate must select definite kinds and certain intensities of both reflected color by daylight,—and transmitted color by artificial light—stimulus, placed at distances that are requisite for safety in after-work.

The apparatus for a test<sup>8</sup> which I have applied for this purpose among railway employes, consists in a fixed framework which can be placed anywhere upon a company's property. Wooden frames containing properly and proportionately sized match and confusion colors of bunting for daylight work, or illuminated plates and lanterns of similarly tinted transmitted color for bad weather or for night time, are lined in a row in any order whatsoever, just as the wools for near-testing are promiscuously thrown upon a table. The five test-colors similar to the ones that I have employed in my method for near-tests<sup>9</sup> are placed in an upper tier. The comparison colors are arranged as desired at the time, in the lower tier. Just as with the near-work tests, the candidate employs one eye at a time: This done, he is then made successively, to designate the nearest numerical match to each of the upper test colors by the actual position of the corresponding color in the lower line. A written copy of this selection by number is to be handed to the examiner, who, after obtaining the true color names of the numbers chosen for the occasion from a proper attendant, places the choosings upon suitable blanks for expert decision and permanent registry.

To obtain the different percentages of light stimulus and to simulate as closely as possible, changes in the character of weather (fog, rain, etc.), variously tinted glasses may be used; although preferably, the candidate can by this plan be tested during the actual states of weather. An experimental track with a number of open switches so arranged that the sidings pass directly beneath certain temporarily chosen colors placed

6. See article numbered 9, in second foot-note.

7. See article numbered 9, in second foot-note.

8. See article numbered 4, in second foot-note.

9. See articles numbered 2, 5, and 11, in second foot-note.

in the apparatus, would be useful for practically testing the color-vision which is necessary to employ while the candidates for employment are giving selective orders for running locomotives, trolley cars, etc., at full and even high rates of speed.

In marine service, color danger is increased. All vessels carry a green box or a green light on the starboard side, and a red box or a red light on the port, each light being so boxed as to be seen forward and amidships: These are associated with a low white forelight, and sometimes with a high white aftlight. Hence, by comparison, a vessel's course can be easily distinguished either by day or night. If, with such color provision for safety, a vessel were to be placed in the midst of a heavy fog or rain storm, and its movements, while there, governed by an official with subnormal color-perception, who, even during the best of weather, judges the necessary color differences by their intensities alone, it can be understood how such a vessel is practically devoid of all color protection.

For the detection of the defect in marine and naval services, quite simple modifications and empirical adaptations of color-testing by which adequate data may be obtained, can be readily made and employed.

In all railway and marine testing, care must be taken that both the test and the later working colors should be graded in proportionate sizes of area and in relative intensities of tone, thus giving similar distance values to every color that is used: That this should be done, will be at once appreciated, when it is remembered that similar degrees of vividity of color areas of equal size produce such alterations in impression that the colors give rise to false perceptions regarding their relative distances from one another; a condition which may prove most disastrous in well-filled, frequently-plied, and fog-laden harbors. Again, the dominant colors of the reflecting surface near which the signals are to be used (as, for instance, by the green of a hillside, amid the gray and white of a mountain top, and upon the blue of an ocean surface), all play important roles as to the usefulness of the test and the dangers from faulty selections of colors used for signaling. The character of the illuminant itself, as is well known, is of the greatest importance. The blue of diffuse daylight, the greenish or nearly white tint of incandescent zirconia and many of the metallic oxide mantles, the varying degrees of yellow rays from burning oils, illuminating gas and carbon loops, and the purples of free arcs of electricity, show

how variable in tint color-areas must become when they are exposed to such lighting agents<sup>10</sup>.

There should not be any degree of standard in regard to the color capacity of any railway, marine, naval or army official, whose routine duty consists in the differentiation of color. Such positions are relatively few when compared with the great supply of available candidates, and the responsibilities are so grave, that no exception should be made: Such candidates should be rejected without a particle of sentiment.

The lack of systematic and periodic re-examination of the color-sense is another great evil. This inefficiency in color-testing is most reprehensible. After every severe injury or attack of illness, which might be likely to produce visual disturbance, an examination of the color-sense should be made: Moreover, among those who are known, by strict and yet silent, surveillance, to use toxic agents, such as tobacco and alcohol, the tests should be frequently and painstakingly tried.

In regard to the regulation of color-signals for maritime purposes, which can be easily modified and adapted for any other desired requirement, I read a communication upon the subject before the "American Philosophical Society," in 1904<sup>11</sup>. I said:

"When it is considered that the most dangerous periods of time for the safety of lives and preservation of property at sea are those during which the proper recognition of color-signals constitutes the main, and, at times, the only guide for immediate action, the importance of the regulation of the choice of the colors used, the character of the materials employed, the size of the objects submitted for inspection, and the degree and the character of the visual acuity necessary for the determination of such colors, become evident.

"So long as the high seas are necessarily free, and harbors constantly changing in topography and oftentimes difficult of access; rivers and streams occupied in similar places by crafts of varied size and differing speeds; permanently fixed objects, such as buoys and direction and danger indicators, must have color differentiation employed as their main expressive feature; and color-signs must be used to signify the position of large floating masses, such as ships at anchor,—just so long will it remain necessary continually to improve the color material

10. See article numbered 10, in second foot-note.

11. See article numbered 10, in second foot-note.

employed during actual service, and to render the apparatus which is to be used the most simple in construction that can be employed.

"The well-filled harbor, with its changeable and constantly crossing paths containing traffic of every conceivable kind, the instability of the water mass itself, and the uncertain factors, such as fogs, mists and snow, all show to what degree of danger every moving object placed within such a situation is exposed. These conditions are far different in degree of uncertainty from those that are seen in railway travel, in which in the best regulated railroads, the directions of movement are comparatively fixed, every change of direction well protected, and all of the trains carefully guarded by block systems.

"The first question which arises is, Can the system of signaling now in vogue in marine and naval service be so changed as to give better results with less liability to error?<sup>12</sup>

"Experiment and trial have shown that the visual apparatus which projects man's ordinary sensory powers possibly to the greatest distance into space, must be the sensory organ which is preferably to be employed during the common routine of duty. Fixed or intentionally changed color differentiations being less unstable, and hence more certain for visual perception than mere recognition of form and objective motion, must be that which should be practically employed. As the result of experience, the coarse colors, red, green, yellow, white and blue, are the ones which have been found to be the best for use during maritime signaling. These colors, which are either placed in related situations upon movable bodies (both while in motion and while at rest upon bodies of water), or which are situated in fixed positions, are made interchangeable and time-regulated. These colors, possessing definite color-arrangement and color-sequence, are intended either to express direction, to signify protection or to designate code-signaling; varieties of work—the correct and, at times, vital answers to which are dependent solely upon color recognition at distances which are comparable with safety to large moving masses that often can be alone stopped slowly and gradually—colors and relative positions which must be carefully chosen in regard to distances, situations, etc.

12. Better, less complicated, and hence cheaper and more easily applied adaptations of the Hertzian Ray apparatus might accomplish the purpose in one way; but, unfortunately, unless such instrumentation is automatic in action, and unless its management and use can be kept constantly correct, this method must be considered in the light of the future.



In the following paragraphs it has been endeavored to express clearly and briefly the specific reasons for the improvements and changes suggested.

I. All of the color tints to be used both by reflected light-stimuli and transmitted light-stimuli (day and night) during actual duty, should be officially proved copies of standards which have been carefully chosen in such a way that the signals may be uniform in tint in spite of variations in the character of the illuminants themselves. These selections should be made by an international commission of normal-eyed color experts. The color-signals will then be universally alike, thus minimizing danger from confusion due to false color exposures. (These results can probably be best obtained by mathematically and analytically obtaining sample pigment hues, both for diffuse reflected solar light and diffuse refracted artificial light, of specified kinds, character, degrees and tints, which are equivalent to the midway bands for the colors used in the corresponding portions of the color spectra obtained during exposure to the illuminant to be employed during actual service.)

II. Each vessel of any importance should be provided with proportionately-sized miniature samples of color-boxes, color-lamps, signal-colors, etc.,—or better, fitted with full-sized examples of the same,—all carefully protected and boxed. These should be used as guides for the tinting of all material which employs color as its basis for signaling of any kind. These materials should be certified by proper authority, and should be obtainable at cost of licensed shops in every port of any consequence.

III. It should be a part of the official duty of every national, state and municipal government to see that the materials which are used for color-signaling in any form, as well as the samples, are periodically examined as to cleanliness and stability of tint. Dated certificates, brief and to the point, with plain instructions for the easiest manufacture and the best plans for the preservation of the color materials, together with clearly expressed rules for distances used, situations employed, and notes on any color peculiarity of certain places, should be given; these to be submitted for inspection on demand.

IV. Every series of related colors used should be regulated, both as to their comparative sizes of exposure and the relative degrees of color saturation; these should be duly proportionate

in reference to equalities, distinctness, relationships and association at safe distances, and with regard to differences in degrees of penetrability. This can be accomplished either by having the color values graded proportionately (a bad plan, since it tends to weaken the value of the stronger colors), or by making the color areas relative in size: for example, to give a green signal light a similar degree of brightness, and hence the same relative distinctness, as red, it must either be five times more powerfully illuminated than the red or given five times more exposed superficial area: so too with all other color changes; there is an idiocratic relationship. Clinical experiment has shown this, (see article numbered 1 in second foot-note), and laboratory research has confirmed the practical findings. The importance of this factor can hardly be overestimated when the series of individual signal colors are numerous in well-filled and busy harbors.

These plans once agreed upon by an International Commission, all necessary data will soon become common property, and in consequence the system will be universally understood.

## THE EXPRESSION OF CATARACT IN ITS CAPSULE.

With conclusions from experience of 45 operations.

By H. V. WIRDEMANN, M. D.

SEATTLE, WASH.

In an address\* upon this subject at Atlantic City in June, 1909, before the Section of Ophthalmology of the American Medical Association, I went into the history of the expression operation for cataract, showing that it was original with A. Pagenstecher, being first described by him in September, 1865, at the Heidelberg Ophthalmological Congress (Trans. 1865), and that it had been followed by him and H. Pagenstecher, as well as others since that time. Numerous modifications of the method and varying ways of removing the capsule,—the *bete noir* of the cataract operation,—have been tried by various operators:—and now comes a revival from the Antipodes by an operator (Henry Smith, Ind. Med. Gazette, June, 1900, and other papers to Arch. Ophth. Nov. 1908), who is credited with the astounding number of 20,000 cataract operations in a decade, 17,000 having been done by this method; claiming great superiority over the intra-capsular operation, and who has been generally accorded his claims except as to the propriety of the procedure being called "Smith's Operation" or even the "Indian Operation," as practised by Mulrooney of Amritsar long before his time, (Herbert on Cataract Extraction, 1908).

Smith's reports, operations, technique, *et al.*, have been variously assailed, notably by his immediate competitors; the very boldness of his assertions and the greatness of his experience, perhaps, causing such opposition. On the other hand, much fulsome praise has been rendered him by some of his followers, and the technique of the operation for the expression of cataract in its capsule, "a la Smith," has been described as practically impossible of attainment except by operating several hundred times under Smith's own supervision, (200

Read before the Washington State Medical Association, Seattle, July, 1909.

\*For full bibliography see this article.

(Since these two articles have been written the papers on Expression of Cataract, read before the Bombay Medical Congress, have appeared in the Indian Medical Gazette and are being reprinted in the Amer. Journal of Ophthalmology; abstracts now appearing in Ophthalmology.)

according to McKechnie! )—( *Amer. Jour. Ophth.*, June, 1909. )

Thus the Indian reports have been received with suspicion, and not only the operation looked at as a piece of jugglery, but the writings on the subject by Smith and his followers have not received full credence, particularly in Europe. This operation is now being discussed in a more favorable light by American ophthalmologists, especially since the papers of Greene of Dayton, Ohio, who on June 1st, 1909, had done and reported 76 cases, and myself, with 44 operations to that date, the report of Knapp, Jr., of New York, who visited Smith in India, and scattering reports of a few cases by Cheney, Standish, and other Americans.

To the extensive experience of Major Smith and other East Indian operators in cataract operations we Americans can never aspire, for the disease is not so common in this country; all America probably not yielding the number of extractions in a year that are done by this one Englishman alone and in a foreign community; very few American operators averaging over half a hundred cases in a year. My own previous experience of twenty years in an old, established community with many old people, with an extensive clinical and hospital service gave me an opportunity in this line which I can not hope for in the newer West, composed as it is largely of young persons, and the milder climate being not so conducive to disturbances of the clarity of the lens.

In the forenamed address I also discussed the reliability of Smith's and the East Indian operators' statistics compared with those of American, English, and Continental surgeons, noting the often repeated remarks that these East Indian patients disappeared from observation soon after the operation, the apparent lessened susceptibility to infection of the East Indians, who live like animals near to the soil, whose wounds heal quickly and kindly despite their dirt, and that we must for the end results depend upon the testimony of those who practice in more civilized countries where their patients' life history can be followed with more exactness.

If the dread of the remote complications is relieved by further experience and the ultimate results of the operation are as good as has been the case in my hands to date, I shall continue to practice expression for most cataracts. With Greene and with McKechnie, (*Arch. Ophth.*, May, 1909; *Amer. Jour. Ophth.*,



June, 1909) Smith, and other East Indian operators I now consider it to be adapted for practically all forms of uncomplicated cataracts, the exceptions being the traumatic, infantile, adolescent and hypermature forms, and preferable for immature or slowly progressing lenticular opacities; for thereby the time, mentality, and even the life of valuable men and women, whose work, dependent as it is upon their vision, need not be quitted except for the few weeks of operation and after treatment, when they are again restored to usefulness:—a decided contrast to the weary weeks, months, and years of waiting necessary in many cases before the eye is ready for operation by the capsulotomy method. Likewise the preliminary iridectomy and ripening operations, and in most cases secondary dissections of a thickened capsule, with all their dangers are rendered unnecessary.

The immediate and total removal of all the obstructions to vision, not only the nucleus and some of the cortex, but all of the capsule, all of the cortex together with the nucleus; the almost utter absence of iritis and closed pupils with dangerous secondary operations and post operative glaucoma or cyclitis, the simplicity of the after treatment, (first dressing on the 5th to 8th day,—no atropine necessary), and above all the greater proportion of high grade results in visual acuity, neutralizes the hypothetic fear of loss of vitreous,—which is not more than in the generally performed extraction operation. This is so in the successful cases; but of course, when the capsule strips off and remains in the eye the obstruction to vision is even more pronounced than in the intra-capsular operation and requires a secondary operation. This has happened in only two out of forty-five of my cases.

The high astigmatism seen in some cases has been due to faulty technique, the incision being either too far in the cornea or too far back and due to delayed union and over-riding of the lips of the wound. Some cases of vitreal loss are due to an insufficient opening for the lens accouchment, which then requires much more and forcible manipulation, and here I found the trouble with the 60° radial incision of McKechnie, hence obtaining my best results with a sclero-corneal and conjunctival flap incision. Other cases depend upon the assistant and are largely obviated by the use of the Fisher lid holder which renders a highly skilled assistant unnecessary. The distorted pupils of Greene's

(*Ophthalmology*, Jan., 1908), and my first series were due to too large an iridectomy; mine now embracing only about half the width of the iris and confined to its pupillary edge. Without an iridectomy there is too much damage done to the posterior surface of the iris, as I have demonstrated by transillumination, (*Ophthalmology*, July, 1908). All these minor criticisms are chargeable to the operator and are obviated by better technique.

Referring again to the capsule and more particularly to the part it plays in causing delayed union of the cornea by impaction between the lips of the wound, the following series of illustrations kindly loaned by my friend Dr. Tooke of Montreal, are most instructive. Where the capsule is entirely removed no such poor healing occurs and the wound ultimately leaves no visible scar. (See Figs. 1, 2, 3.)

My series of 45 expressions out of 154 cataract operations done within two years were mostly in private practice, only seven of the 45 expression cases being in my public clinic. The 40 described in my previous paper and discussions, while selected for this purpose, being of all kinds, ages and stations of life, and hence somewhat different from those of our colleague, Dr. Greene, whose operations were mostly on men of advanced age located in a public institution, The National Veterans' Home of Dayton, Ohio. Our two series offer you a beginning in America which may perhaps be enlarged by other operators of greater opportunity.

One of the most amusing criticisms of this operation from a scientific standpoint that I have heard comes from some of the older surgeons:—"Why should we give up an old, well-tried, and satisfactory procedure for something new that we have to learn all over again?" Where, indeed, would be the advance in science if we all felt that way? True it is that Greene and others, as well as I, found that this operation, which may be briefly described as "ordinary combined extraction with the omission of one step—the opening of the capsule," from its very simplicity put us in the position of novices, making us learn the technique of delivering the lens all over again, and that only after a considerable experience have we acquired sufficient dexterity and confidence. You, too, who may not have tried it, had better begin on the eye of the living dog or rabbit—(dead pigs' eyes are not adapted for the practice on account of the largeness of the lens and

the friability of the hyaloid membrane), before touching the human subject, as Greene and I did. I believe competency for criticism of this procedure should only be obtained from personal and prolonged experience, and not as it has been treated by our British Brethren from the theoretical side.

As it may be interesting to learn the details of the operation as practiced by me, for I can say with another operator, "The details of the operation are my own," and as I have myself learned greatly from the expositions of Greene (*Trans. Sec. Ophth., Amer. Med. Assn., 1909*), and Smith, I will briefly describe the operation, noting that full comprehension of the procedure must be acquired not from such a description or even by seeing the operation, but by doing it, and that in a number of cases.

I do not deem the purely corneal section (Fig. 4) acceptable for in my experience this may be followed by slow healing, iridic prolapse (Herbert), distorted pupils (Greene), and excessive astigmatism; and the accouchment of the lens when large

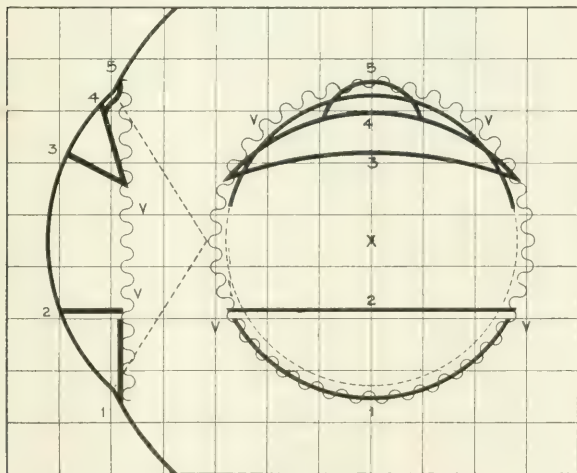


Fig. 4.

Incisions of the Eye (modified from McKeehan).

1. Corneo-scleral Incision dividing many vessels.

2. Meridional Incision dividing few vessels.

3. Radial Incision dividing few vessels.

4. Corneal Incision with (5) conjunctival flap dividing few vessels.

X. Center of cornea.

V-V Vascular fringe at limbus.

is very difficult, the manipulation leading to vitreal prolapse, and I find that the healing is not such as is theoretically depicted by McKechnie (*Arch. Oph.*, May, 1909). Neither is the operation without iridectomy on account of iridic prolapse. My experience has shown that the 2/5 sclero-corneal section with conjunctival flap, as where this is made delayed union is unknown, combined with a very small iridectomy and expression of lens, *i. e.*, the regular operation less a capsulotomy, in immature and hypermature cataracts, is the only all-round satisfactory operation.

The ordinary run of mature cataracts may perhaps be as well operated upon with less risk in the average hands by the gen-

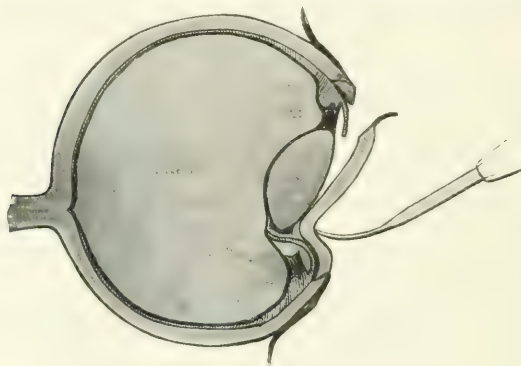


Fig. 5.

Retroversion. Rupture of suspensory ligament below and to one side.

erally adopted flap extraction with capsulotomy; cataract in children and traumatic cataract by discission.

The "absence of details," *i. e.*, the least handling of the eye and the fewest instruments possible is the characteristic of this operation and what with the *tactus eruditus* makes it successful in the hands of Smith, Greene, and others; while in some other hands,—notably the critics of the method,—especially those of India,—“do not appear to have benefited much, judging from their results.” It is no operation for a beginner, but it can be safely practiced by the skilled eye surgeon.

A stop speculum should not be used on account of the ever-present danger of a vitreal prolapse. The lifting of the upper

lid by a squint hook is practised by Smith; Greene uses the Noyes retractor; I prefer the lid holder of William Fisher of Chicago, and have the patient's upper lid, the only one of moment, under full control, and thus lose vitreous in not more than 5% of cases (in my recent operations) either with or without capsulotomy. After the incision of the cornea the patient should never look down but preferably ahead. The eye is fixed by catch forceps, the knife is entered, (the only instrument usually entering the eye), and a corneo-scleral section with a conjunctival flap is made. (*vide McKechnie in re Incisions.*)

A very small iridectomy is done, (the section of the iris



Fig. 6.

Anteversion. Rupture of suspensory ligament above—Somers with half way.

only embracing the pupillary margin and the sphincter muscle), by pressing the ends of iris forceps on the cornea over the upper part of the pupil, when the iris will usually prolapse, the edge being seized by the forceps, the iridectomy is completed by a single cut of the scissors.

The end of the large hook or the spoon is then rubbed moderately, slowly, and continuously on the cornea at the lower edge of the lens slightly to one side, rupturing the suspensory ligament, the lens tilted backwards, (Fig. 5) *the retroversion*; then the hook or spoon slides under the edge of the lens; (In over half the cases the lower edge turns up in the anterior chamber and presents first at the corneal wound,



turning a somersault) (Fig. 6), *the autoversion*; the pressure gradually relaxing as the lower edge of the lens enters the wound, (Fig. 7), *the presentation*; the body of the lens is lifted up by the pressure of the hook, which follows it in its accouchement; the flat spoon of Pagenstecher or Smith may be used to assist the lens to slide out of the eye by offering an inclined and smooth plane for it to glide upon. Seldom is the spoon entered the eyeball, forceps are occasionally necessary to seize the lens when impacted between the lips of the wound; the act is completed by the crochet end of the hook catching the lens, (Fig. 8), *the delivery*, rotating it out of the wound; the conjunctival flap and the iris stroked back into

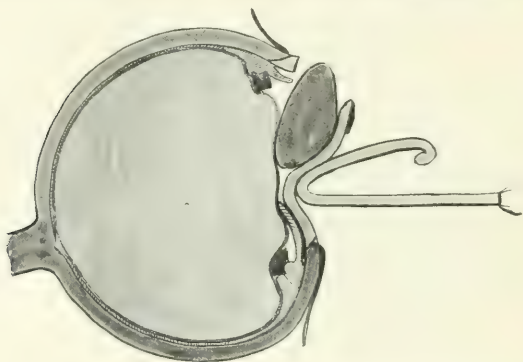


Fig. 7.

Presentation. Lens free. Somersault completed.

place, the lids closed and a light bandage applied. The first dressing is usually made on the 5th day unless otherwise indicated. It is noteworthy that Greene and I concur in the opinion that while the cataract appears to enter the vitreous the hyaloid membrane is not usually ruptured and hence vitreous does not generally escape. (See Figs. 5-8.) This is a brief description of the method I have adapted and adopted.

My expression cases are comparatively few, but compare very favorably, and in fact the results are to my mind better than those of about 1000 regular extractions performed by me within the last twenty years, and especially with the last 155 operations done since January 1st, 1907.

Again I repeat that the operation requires more skill than

the intra-capsular method, and is possibly more dangerous except in the hands of an operator whose touch is fine, who has no trembling fingers, and whose judgment is the most exact; but given these conditions and a proper patient the results are better than in the other form of operation.

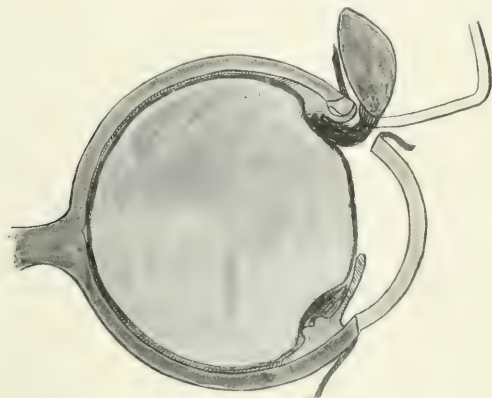


Fig. 8.

Delivery. Ligament remaining attached above and being loosened with crochet hook.

In conclusion I show you a series of 30 lenses removed by expression, and about 100 by extraction. A comparison of the specimens is a striking exhibit of the merits of the expression operation which is likewise substantiated by the living witnesses now enjoying its results.

## CAPSULE FORCEPS IN CATARACT EXTRACTION.

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MONTREAL.

The introduction of a subject of such an essentially practical nature including as it does pathological features of a more or less simple yet none the less interesting character, is I feel sure in accordance with the wishes of your committee who requested that the papers brought before this section should be made as practical as possible. The almost universal practice of my teachers, Axenfeld, Fuchs, DeLapersonne, and Treacher Collins, the experience which I have obtained from cases of my own, experimental work done upon the cadaver, added to a pathological appreciation of operative technique, warrants the selection of the subject. It is my wish to appeal to all interested in ophthalmic surgery and more particularly to those whose practice it has been, either from ultra conservatism or from inexperience with capsule forceps, to adhere to the older method of employing the cystotome in all cases of extraction.

The special technique in the use of forceps is briefly as follows. After the initial corneal incision has been made, preferably with a conjunctival flap covering its uppermost point, an iridectomy is usually performed. After the segment of iris has been excised, when one wishes to release the lens cortex from its enveloping capsule and zonule of Zinn, the capsule forceps are now employed. The instrument is held in the right hand and the patient directed to look downwards when the globe is held with a pair of fixation forceps in the left hand, if movement of the eyeball cannot be kept under reasonable control by the patient. The tips of the capsule forceps are now introduced, closed, through the lips of the corneal incision into the anterior chamber, and are carried downwards as far as the lower pupillary margin, or even slightly lower, beneath the iris and to one side. With the blades of the instrument in this position within the chamber, they are allowed to open, and after very gentle pressure upon the underlying capsule the membrane is caught between the

\*Read before the Canadian Medical Association, Ottawa, 10th June, 1908.

sharp teeth of the tips when they are brought together again. The first rent in the capsule is made by a gentle to and fro movement and the tear is continued in a crescentic or semilunar direction, following the margin of the pupil, the forceps being withdrawn at the point where they were originally inserted. Should the details of the technique have been followed correctly, a piece of hyaline capsule tissue should be seen included between the teeth of the forceps and this one may float off in a watch glass of distilled water in order to demonstrate its presence. The subsequent course of the operation is proceeded with in the usual way.

Some of the advantages to be gained by following this procedure are briefly as follows: One pair of forceps is suitable for either eye, not requiring to be bent or twisted into various shapes as is so frequently necessary in the case of the cystotome. An additional advantage is that frequent sharpening of the instrument is not necessary, a precaution which must often be attended to in the case of the cystotome.

After the torn capsule has been removed from the chamber, no post-operative cataract or capsule shreds remain about the pupillary area requiring subsequent discission; as soon as the eye has recovered its equilibrium a refraction is possible and a correction may be prescribed at once without having to submit the patient to a second operation, a procedure as frequently unexpected by the patient as undesired by the operator. Although much may be claimed for peripheral capsulotomy, a tag or adhesion may escape section at one point or another, the membrane falling back over the pupillary area after the lens cortex has been expelled. One is therefore only able to feel confident when one sees for oneself that a piece of membrane has actually been removed from the anterior chamber, by noting it included between the teeth of the forceps, or after floating it off in distilled water.

With removal of the lens capsule and after the employment of mydriatics, or occasionally of myotics, the formation of synechiae from a post-operative iritis is less likely to occur. Further, a great deal of the post-operative toilet of the wound to remove particles of capsule from between the lips of the incision is not rendered so necessary. Again, when a large piece of capsule has been removed, the whole cortex

is more likely to be extracted and fewer lens fibres are consequently retained in the posterior chamber.

A feature of the utmost importance, for which the capsule forceps is mainly responsible, is the more ready tendency towards healing by first intention. By the older and more conservative method of employing the cystotome, some shreds of capsule very frequently find their way between the lips of the wound, and primary union is in consequence not only occasionally delayed but actually prevented. With the remains of the capsule completely removed and with the additional support of a good conjunctival flap, primary healing is almost positively assured, and such unfortunate complications as a

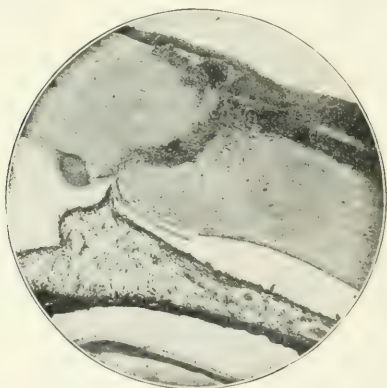


Fig. 1. Section of eye removed post mortem two weeks after operation. Healing of corneal incision by primary intention.

break of the incision and loss of aqueous after some involuntary spasm as coughing or sneezing, are seldom if ever met with.

To emphasize my last statement, I have prepared sections from a series of cataractous eyes, each eye having been removed post mortem, practically an equal length of time having elapsed after operation before death occurred in each case. Fig. 1 is an instance of a normal case where, after a perfectly clean and uncomplicated incision, primary union is seen to be well under way. The bridging over of the wound by new fibro-connective tissue elements has produced a globe where weakness at the point of incision need not have been subsequently feared. The



healing at this point has been complete, although Descemet's membrane and the stump of the iris have barely escaped inclusion. A second case shows a section of a perceptibly weakened globe: union here is of the weakest possible kind, consisting of a form of granulation tissue which has extended from the epithelial elements of the bulbar conjunctiva downwards into the wound. Union of any kind in the lower two-thirds of the incision has been completely prevented by the inclusion of a large piece of hyaline tissue. A sudden break in the chamber with loss of aqueous, not to mention other equally serious complications, would not be unexpected in a globe so evidently weakened by an included membrane. (Fig.

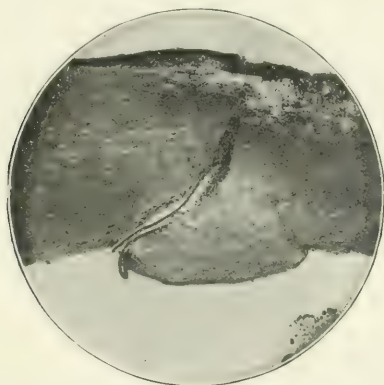


Fig. 2. Section of eye removed post mortem thirteen days after operation. Healing retarded, due to included membrane between the lips of the corneal incision.

2.) A definite measure of support to this incision has been afforded by a conjunctival flap which, superficially at least, has succeeded in holding the lips of the incision together. Another instance of impaired union is seen in Fig. 3. The globe, it is true, is not weakened to the same extent as in the last case where union has practically had to be maintained by a conjunctival flap and some granulation tissue. The outer half of the globe is held together by definite fibrous tissue, as well as by a good conjunctival flap, although a distinct element of weakness must result from the non-union of the lower half of the wound due to an included anterior lens capsule. An in-

filtration of the new connective tissue elements about the wound, the presence of leucocytes in large quantities about the innermost part of the incision in the neighborhood of Descemet's membrane, as well as on the anterior surface of the lens capsule within the chamber, would point to an inflammatory reaction for which the included capsule should be held responsible.

I am ready to admit that there are certain cases where other procedures might be followed more safely; cases of a very friable zonular ligament, as well as those where a cataract has complicated myopia, might perhaps be better treated with the cystotome, the fibres and capsule being subsequently re-

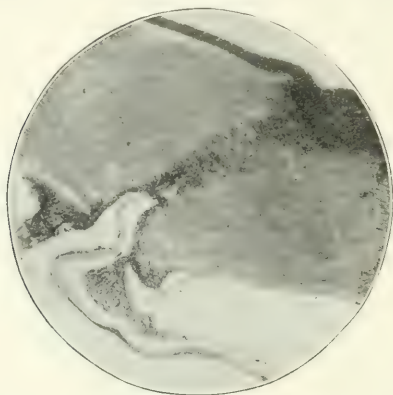


Fig. 3. Section of eye removed post mortem. A distinctly weakened globe shown to be due to inclusion of anterior lens capsule. Infiltration of leucocytes in anterior chamber as well as about the base of wound due to the same cause.

moved by the very careful use of an irrigator. Yet many will agree that the employment of an irrigator is attended with its own dangers as far as loss of vitreous is concerned.

The objection is held by some that by employing forceps additional pressure has to be exerted upon the lens, and that possible rupture of the suspensory ligament and dislocation of the cataractous lens into the vitreous may result. This, however, need not of necessity follow. In order to obtain a grip of the capsule very little extra pressure need be exerted upon the lens than when the point of the cystotome punctures the capsule; quite naturally if roughness is resorted to, or if the

eye is not able to be kept under control, accidents will happen with one instrument as with another.

The pattern most commonly seen resembles in many respects an ordinary iris forceps, with the tips curved slightly upwards, the main point of difference being that the small sharp teeth are directed downwards, as well as inwards, instead of inwards only as is the case of the iris forceps. A pair of forceps which I have found most useful and which I have employed a number of times at the Royal Victoria Hospital with satisfactory results was made for me by Messrs. Wulff-Luer, of Paris. The handle is approximately 8 cm. long, tapering to a slender tip, where an extension arm of about 8 mm. is welded at an angle of  $120^{\circ}$  to each blade. These tips are curved concavely below and conform with the underlying convex surface of the lens. The tiny, sharp teeth are directed downwards and inwards and interlock at the distal ends of the tips. This instrument has one or two advantages over other patterns which I have so far seen in use. After inserting the tips into the chamber, pressure may be more evenly distributed over the whole zonular ligament, and consequently minimized at any one particular point where it must of necessity be exerted in other patterns where one point only is directed, as well as in the case where the cystotome is employed. The blades or tips of the forceps being curved concavely downwards an entanglement of the iris fibres need not occur. I am considering the advisability of further modifying this instrument, and of inserting an additional set of teeth nearer the heel of the tips in order that a more complete grip of the capsule may be obtained and that the removal of a larger piece of capsule from the pupillary area may be assured.

In conclusion I wish to acknowledge with gratitude the kindness of my friend Dr. Byers for supplying me with the specimen illustrating Fig. 3, a pathological representation of a number of the more important clinical findings which I have attempted to bring before you for consideration in this paper.

## SOME UNUSUAL COMPLICATIONS OCCURRING DURING AND FOLLOWING THE EXTRACTION OF CATARACT.

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In order to discuss some of the unusual complications that may occur during and following the extraction of cataract, the writer has thought best to relate from his personal experience a number of illustrative cases and to consider with each the remedies and measures best suited for their relief. It will be observed, therefore, that among the following cases there are some conditions that, unfortunately, with our present knowledge, can be neither foreseen nor prevented. There are, however, a number of unusual complications that with good judgment, quick decision and prompt execution may change what threatens to be total failure into assured success.

*CASE 1. Senile cataract; combined operation; left arm of operator struck by patient during making of section; rapid ejection of lens followed by extensive prolapse of iris and vitreous; sexual intercourse a few hours after operation; recovery with normal vision.*

H. B., male, aged seventy-five years, was operated upon for senile cataract of the left eye January 24, 1897. The patient was exceedingly well preserved, in active business, the lens was mature and no complication was anticipated. It was impossible to prevail upon him to go to a hospital for the operation so the latter was performed at his home and he was to be taken care of by an untrained nurse whom he selected himself. It was afterward discovered that he was a man of violent temper, who apparently had never made any attempt to control his passions, but this was not known at the time.

Under cocaine anaesthesia the operation was begun, my position being in front of and beside the patient. When the corneal section was about completed, the patient lost control of himself, began squeezing his eyelids to the utmost and suddenly, without warning, struck me a terrific blow on the left arm with his right fist. This caused the fixation forceps

to fly from my hand across the room at the same time that I had completed the section, coming out somewhat shorter than usual. Simultaneously the lens was shot several inches into the air and there was a large prolapse of iris and vitreous. As rapidly as possible the knife was laid aside, the speculum removed, the lids closed and a wet bichloride compress applied. There was some chilliness and nausea but no hemorrhage except from the conjunctiva.

After the patient was somewhat quieted an iridectomy was performed, the protruding vitreous, which was fortunately of good consistency, excised and the eye thoroughly irrigated with a warm physiologic saline solution. Though no attempt was made to inject this solution into the eye, I am confident from the gaping of the wound that much of it entered. Both eyes were dressed and the patient was left with the belief that the eye was probably lost. That evening the patient was comfortable, and when I called to redress the eye the following day, the mask, bandage and dressings were found around his neck and both eyes were entirely exposed. To my great surprise, however, the eye looked as well as in any patient I had ever seen, apparently uninjured by the extraordinary behavior, both at the time of the operation and subsequently.

When I called to change the dressings on the third day, I found the patient in his back yard, with the dressings pushed upward on his forehead, playing with a litter of puppies. In spite of these facts, however, and that it was impossible to keep him quiet, he made as complete and uneventful a recovery, so far as any ocular complications were concerned, as I have ever seen, and when he was glassed five weeks later his vision was 6/vi., he could read Jaeger 1 readily, and the media were perfectly clear.

This patient was seen frequently up to the time of his death, a period of four years, and the eye retained permanently its good condition.

About three months after the operation I learned that, in addition to the above complications, he had cohabited with the nurse on the night of the day the operation was performed, which explained the disarrangement of the dressings on the following day. After hearing this I concluded that it was impossible for some eyes to be lost. Further comment concerning the case is unnecessary.

*CASE 2. Combined operation for cataract on right eye; recovery with good vision; two years later combined operation on left eye followed in twelve hours by intra-ocular hemorrhage with loss of eye.*



J. D., male, aged sixty-three years, presented himself at the eye dispensary of the Methodist Episcopal Hospital, Philadelphia, in November, 1903, with a mature senile cataract in his right eye and an immature cataract in his left eye. He was exceedingly well preserved, his light field and light projection were good, and the urine examination was negative, so he was admitted to the hospital for operation. The mature lens of the right eye was extracted by the combined operation without difficulty, and healing was prompt, without any complication, the patient obtaining 6/xii. vision. In 1905, or nearly two years later, the patient returned for operation upon his left eye, the cataract in that eye now being mature. On Oct. 3, 1905, at 2 p. m., the lens of the left eye was extracted by the combined operation and at the same time a dissection of a slightly thickened secondary membrane was performed on the right eye. There were no complications whatever, the patient being quite docile. At 2 a. m. of the night following the operation, or twelve hours after its performance, the patient complained of severe pain and an examination by the resident physician showed the dressings to be stained with blood. The patient was seen by me a little later and an examination showed the dressings to be saturated with blood, a large clot occupying the space between the eyelids and protruding from the widely gaping lips of the corneal flap. The clot was excised, a pressure bandage and ice applied, ergot was administered and the head of the bed elevated. In spite of all treatment, however, blood continued to ooze from the interior of the eye so that the dressings had to be changed repeatedly. Believing that nothing further could be done to save the eye, and as the patient was losing considerable blood each day, the eyeball was eviscerated on Oct. 11th. Slight oozing continued for twenty-four hours and then ceased. On Oct. 13th, ten days after the extraction was performed, the patient became mildly delirious and in the presence of nurses and residents, who could not reach him in time to prevent his action, quickly sprang from bed, and jumped through the window to the ground below. When brought back to the ward the patient talked quite rationally but was unable to give any explanation for his action. Examination showed that he had a compound comminuted fracture of the lower end of the right humerus, a slight abrasion of the right knee and a sprain of the right ankle. This is somewhat analogous to the case of acute mania following extraction reported by Randolph<sup>1</sup>, who, after apparent mental recovery, jumped from the hospital window to the ground twenty feet

<sup>1</sup> Trans. Amer. Ophthal. Soc. V. 8, P. 129

below, "scaled a high iron-spiked fence, and was making off, when overtaken by an orderly." During the following week the patient's actions were somewhat queer at times, though he answered all questions rationally and on the 21st, as he insisted upon leaving the hospital, he was given his discharge. The eye had healed from the evisceration, there had been no bleeding since the day following the latter operation, and the vision obtained in his good eye was 6/vi.

The question of post operative intra-ocular hemorrhage has been discussed recently by Brav<sup>2</sup>, who reported a case and made a review of the literature. In 1896 Spalding read a paper on this subject before the American Ophthalmological Society, having collected fifty reported cases. To these Brav has added twenty-five more.

The accident is certainly exceedingly rare, and in those cases which have been examined microscopically seems to have been due to retro-chorioidal hemorrhages. Its onset is usually sudden and may occur immediately after an operation or somewhat later. There is severe pain and, as a rule, nausea and vomiting, which, in a short time are followed by the appearance of blood soaked dressings. An examination usually shows a large clot protruding from the interior of the eye between the lips of the wound and occupying the space between the eyelids. The condition unfortunately ends in total destruction of vision, and in most instances it is necessary to enucleate or eviscerate the eyeball. So far as is known from a study of the reported cases it is impossible to foretell the appearance of the condition. Moreover, it seems to be entirely unavoidable. Brav states, in his review, that in most instances the hemorrhage occurred within one hour after the operation, a few occurring as soon as the corneal incision was completed. Several instances have been recorded in which the first eye has been lost by intra-ocular hemorrhage and the fellow eye successfully operated upon later without the occurrence of hemorrhage.

As to the treatment we have been able thus far to do nothing toward the preservation of vision, but the head of the bed may be elevated, cold may be applied to the affected eye and a hypodermic injection of morphia may be administered to quiet the patient. In my own case there was no reason to believe that any complication would ensue; because of the successful result obtained upon the fellow eye two years before, and at the time of the operation there was no complication whatever. Twelve hours later, however, apparently without cause, the

<sup>2</sup>. American Medicine. New Series. Vol. 2. No. 5, pp 314-17. May, 1907.

hemorrhage occurred, and eight days later it was necessary to eviscerate the eyeball and employ firm pressure within the orbit in order to check the oozing.

*CASE 3. Extraction of cataract in a patient slightly demented; prompt healing of the wound and recovery of good visual acuity accompanied by increase of dementia and subsequent death.*

J. T., male, aged seventy years, was admitted to the Methodist Episcopal Hospital, Philadelphia, March 24th, 1902. Examination showed senile cataracts in each eye, the left being mature. The patient's condition was exceedingly feeble, although he had traveled from southern Delaware unattended, and it was thought inadvisable to operate until some improvement was obtained. He was therefore placed upon general tonics and given nourishing food. In a few days his general condition was much improved, he walked quite erect, his voice was much stronger, and his heart action good. It was observed, however, by the resident physicians and nurses, that the patient was picking occasionally at the bed clothes, that he was wandering into portions of the ward where he had no business to go, that he would not remain in bed at night but, getting up, would be found wandering through the hospital, and that he talked at times more or less irrationally. Upon one occasion, for example, he was attempting to lift a table into his bed, and upon inquiry as to what he was doing, stated that he was "hiving his bees." My attention, however, had not been called to this phase of his condition, and I was not aware of it until after the operation had been performed. The general state of his health after treatment for a while was such that it was deemed advisable to perform an operation for the removal of the cataractous lens, and this was done therefore, under cocaine anaesthesia, on April 1st, or one week after his admittance to the hospital. During the performance of the operation the patient was perfectly quiet, not giving the least trouble, and the operation was performed with a small iridectomy. As the lens was being delivered the upper edge seemed to catch beneath the scleral border of the flap and could not be delivered until a wire loop had been passed above it, gently forcing the edge downward so that it could come out over the flap. After this maneuver it was delivered without further difficulty, no cortex remaining. On the day following the operation the eye was inspected and the lips of the wound found to be united with the anterior chamber reformed. The patient remained quiet for twenty-four hours, when he began to grow restless. In forty-eight hours he was unruly, demented, endeavoring to

tear the bandages from his eyes and talking loudly in an irrational manner. His hands were tied and the condition continuing, the bandage was removed from the unoperated eye on the third day. This, however, did not improve his mental condition (the patient being able to see but little from this eye), so that hyosein, the bromids, and at times morphine, had to be administered. Notwithstanding the mental condition of the patient and the fact that his hands were tied and that he was gotten out of bed and placed upon a chair on the fourth day, he continued to take nourishment for a week after the operation had been performed, conversing at times very rationally. During this period the eye made an uneventful recovery, not the least symptom of inflammation manifesting itself at any time. The patient counted fingers distinctly, could distinguish the faces of those around him and name the various articles of clothing which we wore, and the eye would have been left uncovered, except for smoked glasses or a protective patch, had it not been for the fact that he was continually picking at his nose and rubbing his eyes, so that we were afraid he might break open the wound by pressure or produce a hemorrhage. The eye was therefore kept covered for these reasons. At the end of a week he passed from the struggling, demented, mental condition into one of quietude, absolutely refusing all food. He would lie in bed with his mouth open (he had been a mouth breather during the whole time), presenting the facial appearance of one about to die, except that his color was good. Forced feeding was employed and from two to four pints of liquid food were placed into his stomach each day and were always retained. On the tenth day following the operation there was suppression of urine, and from this time until his death three days later, the urine was voided naturally only once. There seemed to be some stricture of the urethra, and he was catheterized four times in every twenty-four hours. He became quite constipated so that purgatives and enemas were employed to keep his bowels free, and a few weak hypodermic injections of pilocarpin with strychnia were given to produce diaphoresis. During this period the eye continued perfectly well. The eyeball was no redder than its fellow eye and the patient had obtained excellent vision. On April 14th, the thirteenth day following the operation, the patient was given his liquid food at 4 p. m., and at 4:05 p. m. he gave a sudden gasp and died. No autopsy was permitted. No albumen or sugar were found in the urine at any time.

It would perhaps have been better had this case not been operated upon, but as I was unaware of the fact that the pa-

tient's mental condition was not entirely normal prior to the operation, and as his general physical condition was so much improved, the operation seemed to be justified. It is a well known fact, however, that in very old people the symptoms of senile dementia occasionally follow operative procedure, and that in those patients in whom the process has already begun, its progress is often accelerated. In this particular instance the senile cerebral changes had apparently started, and although the eye did remarkably well, healing without complication, the patient was too far advanced into the state of senility to recover.

Death, as a complication following cataract extraction has been reported several times (Pooley<sup>3</sup>, Herman Knapp, Harlan, Wadsworth and others), and in most instances seems to have been brought about by the sudden appearance of diabetic coma. In a few, however, the patients have just gradually grown weaker and weaker until death ensued, and this class very probably is due to the rapid advancement of the senile changes.

*CASE 4. Combined extraction of cataract without complication: non closure of wound for seventeen days followed by infection.*

M. Q., a married female, aged fifty-two years, had a mature senile cataract extracted from the right eye on April 11th, 1902, by the combined operation. No complication occurred, either during or immediately following the operation, and the patient's general condition was very good, the urine examination being negative. When the eye was redressed on the following day the anterior chamber had not reformed, the lips of the corneal flap not having united. The patient was kept in bed and the dressings changed daily, at the time of each dressing the eye being gently irrigated with a warm physiologic saline solution, but the lips of the wound did not reunite and the anterior chamber remained empty. Thinking perhaps that the patient's more or less restless condition, caused by confinement to bed, might have something to do with the non-healing of the wound, she was permitted on the eighth day to sit up out of bed. Still the lips of the wound did not unite, though the eye remained white and quiet. At no time was there the least reaction, the eye being scarcely redder than its fellow. A spatula was passed between the lips of the wound in the hope that a piece of cortex or capsule might be withdrawn, the lips of the flap were touched with a strong solution of silver nitrate, the eye was disturbed as little as possible, the patient was given supporting tonics and nourishing food, but at the

<sup>3</sup> Trans. Amer. Ophthalm. Soc. V, 9, p. 518.



time of each dressing the anterior chamber was found to be empty and the lips of the corneal wound, though apparently smooth, were mobile one over the other in a portion of the flap. The patient had a very disagreeable habit of picking at her nose and trying to rub her eye with her fingers beneath the dressings, so that the nurses had great difficulty in preventing her from injuring her eye. On the seventeenth day following the operation, the wound being still open, infection of the flap occurred, being ushered in with severe pain. Applications of nitrate of silver, carbolic acid and the actual cautery checked the progress of the infection to a certain extent so that the patient recovered with a large dense leucoma. Cultures were taken from the infected area but no growth resulted. The patient was advised to return for an iridectomy later but did not do so.

It is very difficult to determine the best course of treatment to be pursued in the class of cases of which this is a type. A few years ago, Harlan<sup>4</sup> presented a paper on this subject before the American Ophthalmological Society after having had experience with two cases in which the wound remained open for more than ten days in one, and for more than three weeks in the other. In the last mentioned case he applied the mitigated stick of nitrate of silver very lightly along the whole course of the wound and it closed a few days afterwards. In his paper he reviewed the literature of the subject, collecting many cases and discussing the conditions and treatment.

So far as the causes are concerned the following have been suggested: "an irregular incision; the presence of bits of capsule, lens debris or vitreous shreds in the wound; hernia of the iris; adhesion of the iris to the posterior lips of the wound; pinching of the conjunctiva or iris in the angles of the wound; entropion occasioned or increased by the dressing; disturbance of the wound by too frequent examinations and dressings; failure of reparative power due to something in the condition of the patient; excessive secretion of aqueous humor."

In the case recorded above there was apparently no foreign substance between the lips of the wound as a spatula was passed several times in order to dislodge such if present, and the incision was quite regular and smooth. None of the other conditions were present, unless it was due to the lack of reparative power in the patient who was thin and possibly not very well nourished.

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<sup>4</sup> Trans. Amer. Ophthal. Soc., V. 5, p. 320.

As to the treatment, Harlan says: "So many cases have been reported in which excellent results have been attained, although the wound has remained open without interference for weeks, that a conservative course seems to be generally indicated . . . With the present light upon the subject, if the wound is clean and in good apposition, I would be inclined to give the compress and atropia at least a month's trial." This is the treatment which was adopted in the above case, but if I should be so unfortunate as to have another, and the patient seemed restless, and it was difficult to keep her from picking at her dressings, I should be inclined, after a week's trial of the ordinary methods, to make a superficial application of the actual cautery. If the patient, however, was cleanly in her habits and could be thoroughly controlled, I should be inclined to adopt the conservative course, certainly for several weeks, interfering as little as possible with the wound. In other words, no two cases can be treated on exactly similar lines, the patient's temperament and general condition having to be given due consideration in determining the course of treatment to be followed in each case.

*CASE 5. Combined extraction of cataract: just before making corneal incision patient had convulsion lasting two minutes: immediately after convulsion operation performed without further complication.*

E. S., male, aged seventy-three years, was operated upon Nov. 29, 1904, for mature senile cataract. The patient's physical condition was good, the urinary examination negative, and he was apparently not made very nervous by the prospect of an operation. It is my custom in operating for cataract to instill a few drops of a 4 per cent. solution of cocaine three times, at intervals of five minutes, and then to wait five minutes before proceeding with the operation. The patient's eye had been anesthetized. The knife and forceps were in my hands ready to make the corneal section, when without the least premonition or warning, the patient had a convulsion, becoming totally unconscious. Both sides of the body seemed to be equally affected. The patient shook rapidly, his head was thrown slightly backward and his hands clenched. In two minutes the convulsive seizure had passed, consciousness had returned and the patient was quite himself again. He stated that never before in his life, so far as he was aware, had he ever had any similar attack. With some misgiving as to what might happen the operation was proceeded with and finished

without the least difficulty and the patient made a complete and uneventful recovery, being discharged two weeks later.

This was certainly a very unusual complication. When it was first observed it was thought that we were possibly confronted with a case of cocaine poisoning, but the symptoms and subsequent behavior of the case proved beyond doubt that this drug had nothing to do with the condition. The patient had never prior to this time had a convulsion of any character, and so far as I have been able to ascertain indirectly, has never had an attack since. Fright did not seem to have anything to do with the condition as the patient stated that he was not nervous, and certainly showed no signs of being in the least degree disturbed by the thoughts of an operation.

In discussing the symptoms with one of my neurological friends, Dr. Charles W. Burr, Professor of Mental Diseases in the University of Pennsylvania, the opinion was advanced by him that the case was probably one of senile epilepsy, and that it was simply a coincident that the first convulsion should have occurred while the patient was on the operating table.

*CASE 6. Primary sarcoma of the iris; removal by iridectomy; subsequent extraction of the cataractous lens followed by wild delirium; prompt recovery upon removal of bandage from unoperated eye.*<sup>5</sup>

M. B., male, aged forty-six years, was operated on April 8, 1896, for a primary sarcoma of the iris which was removed by a broad peripheral iridectomy. Healing was prompt and uneventful. On Dec. 14, 1896, a mature cataractous lens was extracted from the same eye under cocaine anaesthesia. There was no complication during the operation and as usual both eyes were bandaged. The patient had a restless night and on the following day seemed to be exceedingly nervous. On the second night he became wildly delirious, attempting to get out of bed, endeavoring to tear the bandages from his eyes and talking incoherently. This condition continued for two days with occasional short lucid intervals during which the patient begged to have the bandages removed from his eyes. The delirium was so bad and the patient so unruly that it became necessary to have him constantly watched lest he do himself harm. On the fourth day the unoperated eye was left uncovered and within a few hours the delirium ceased, and the patient became entirely rational and continued so from this time on. It is believed, therefore, that in this case the delirium was due to the fact that both eyes were covered, the patient being exceedingly

5. *Annals of Ophthalmology*, Vol. 6, No. 4, October, 1897.

nervous in regard to this point, and that as soon as one eye was left uncovered, the mind assumed its normal condition.

This patient was a representative of that class of cases who become delirious because both eyes are covered and within a short time after the exposure of the unoperated eye the delirium entirely ceased. They, of course, have nothing in common with the class of patients who present post operative delirium which is entirely independent of the covering or uncovering of the eyes.

*CASE 7. Traumatic luxation of the crystalline lens; secondary glaucoma; extraction without loss of vitreous; infection of the wound on the eighth day; recovery with normal vision.*

J. C., a male Italian aged fifty years, was admitted to the ophthalmic wards of the Philadelphia General Hospital in June, 1899, with the history of having been struck on the left eye by the fist of an opponent five hours before admission. There was considerable abrasion and ecchymosis of the left upper lid and brow, the pupil was oval vertically and about twice the diameter of its fellow. The eyeball was somewhat congested, especially in the ciliary region. Further examination showed that the lens had made a quarter turn upon its vertical axis and now pointed almost straight forward and practically divided the anterior chamber into two halves. The cornea was a little hazy, especially in a line corresponding to the anterior edge of the lens and the tension was moderately elevated. After a week's treatment, consisting of rest in bed, bandaging of the eye and the instillation of a solution of eserin, the eye was more painful, the lens quite opaque and the tension equaled +2. The eserin solution made but little effect upon the pupil and, so far as could be perceived, not at all where it was pressed upon by the lens.

After the patient was placed under the influence of ether, Bowman's needle was thrust through the cornea near the center of the upper inner quadrant, and entered into the dislocated lens sufficiently far from the anterior edge to retain a firm hold without tearing loose. Using the cornea as a fulcrum, the handle of the needle was now brought forward and upward and held in this position by an assistant, thus depressing the lens downward and backward into the pupillary space until sufficient room had been cleared to allow the making of a downward section. The section was then made with a narrow Graefe knife, and while a second assistant kept the lips of the speculum elevated from the eyeball, a wire loop was introduced beside the lens, when by a combined movement of the transfixing needle

at the time of its withdrawal, and a quarter turn of the loop, the lens was made to lie flatwise and delivered without the loss of any vitreous. The early healing was good, there being but little irritation and the pupil being round, but on the eighth day, however, there developed slight infection at the site of the corneal wound. Application of the actual cautery was at once made to the point of infection and this was followed by daily applications of carbolic acid. The wound rapidly healed with a scar somewhat larger than is usually observed after cataract extraction, but with correcting glasses the patient obtained 6/vi. vision and could easily read Jaeger 1.

In this patient the appearance of the infection appeared late, but it is the belief of the writer that the eye was saved by the early application of the actual cautery.

It is the opinion of many operators of authority that when the wound becomes infected after a cataract extraction the vision of the eye is almost hopelessly doomed, and this opinion seems to be well founded upon experience. In those cases of wound infection after cataract extraction which I have observed in my own work and in the work of my associates, it has seemed to me that the only remedies that proved of value in checking the advance of the infected area were applications of the actual cautery or of pure carbolic acid. Several times I have seen what appeared to be a hopeless infection checked by the application of one or both of these remedies, and several times I have seen the infected area rapidly advance to total destruction of the cornea when treated by other remedies, so that I have come to believe that when one is confronted with an infected flap an application should be made at once of pure carbolic acid, and, if there is any indication of advancement at the next dressing, followed by an application of the actual cautery. These remedies should be continued from day to day until the advance is checked and in some cases which appear otherwise hopeless, a sufficient amount of clear cornea may be obtained to permit the subsequent performance of an iridectomy or one of its substitutes, thus obtaining more or less useful vision.

*CASE 8. Simple linear extraction of cataract; prompt recovery with normal vision; two years later discission of cataractous lens in the fellow eye with recovery of normal vision; sarcoma of the chorioid discovered in the latter eye nine weeks after operation; enucleation.*

T. B., male, aged eighteen years, was first examined in 1898.

The lens of each eye showed numerous small opacities and there was some chorioidal disturbances. The patient was a bookkeeper and had always complained of poor vision, but it had been growing much worse of late. He was given glasses and a course of alterative treatment, but in a short time his vision became so poor that he was obliged to give up his position as bookkeeper and learn the trade of gas fitting.

Five years later, in 1903, the lens of the right eye was completely opaque, but light field and light projection were good. In the left eye the opacity had increased, but the fundus could be seen indistinctly and was normal, excepting a moderate chorioidal disturbance. The field of this eye was normal. On March 13, 1903, the lens of the right eye was removed by simple linear extraction. There was but little reaction and in seven weeks the patient was glassed, obtaining 6/vii. vision, which at a subsequent glassing became 6/vi. On Jan. 26, 1904, a superficial discission was made of the left lens, inasmuch as the posterior capsule had become so thickened and opaque that vision was reduced to very large moving objects indistinctly. The light field and light projection were good. The lens matter at once broke up, the anterior chamber was filled with small particles, quiet absorption took place and there was but little reaction. On the 9th of March, about six weeks later, the pupil was clear, the fundus apparently normal, excepting the slight chorioidal disturbance, and with a correcting glass vision equaled 6/vi. On April 2, 1904, nine weeks from the time of the performance of the discission, and about three weeks from the time the eye had been glassed, the patient returned stating that the vision of the left eye had become gradually poorer to one side, and ophthalmoscopic examination showed a slight detachment of the retina far forward on the nasal side and slightly below the horizontal meridian. Beneath this detachment was a whitish object, but no distinct details could be obtained as it was so far forward. The field of vision was now contracted corresponding to the retinal detachment. Two weeks later the detachment was more extensive and the whitish area larger in extent. A week later the detachment was so great, vision so much reduced, and the whitish area so much larger in size, that it was believed we were dealing with a sarcoma of the chorioid and immediate enucleation was advised and accepted. A later examination proved the diagnosis to have been correct, the patient having developed a chorioidal sarcoma which did not show by any of our tests prior to the operation and which caused destruction of the eye in so short



a time after the operation had been performed and the patient had obtained normal vision.

There has never been any recurrence of the growth elsewhere and the other eye retains its normal vision.

This very sad case presented no symptoms by which it could be foreseen that a chorioidal sarcoma was making its appearance. The light field and light projection were both good, and there was nothing to indicate that anything but a normal condition would be found. It was particularly sad to have gone through the strain of the operation, to have secured normal vision, and then in so short a time to have found it necessary to sacrifice the eyeball.

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## THE SURGICAL TREATMENT OF STRABISMUS.

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The propriety of operating and the choice of operation in the cases of manifest strabismus demand knowledge (1) of the cause; (2) of the complications, and (3) of the degree. It is assumed as a necessary preliminary in all cases that the visual power and refraction are known and that non-operative measures have failed to co-ordinate the eyes. In this paper functional squint only is considered and paralytic deviations and those due to visible organic changes in the media and retina are excluded. The subject is then narrowed to a consideration of the common cases of internal squint of hyperopia and external squint of myopia.

### 1. Hyperopic internal squint.

A large proportion, probably 90 per cent., of the cases of internal squint are hyperopic. Donder's theory, announced 50 years ago and practically unmodified since, of the relation of accommodation and convergence is an entirely satisfactory explanation. Relative accommodation and convergence or the loss or modification of the independent action of these functions may serve to explain in part the reason why all hyperopes do not squint or why internal squint is present in some cases of emmetropia and myopia. The instability or undue susceptibility of the nervous system to influences of heredity or environment as an etiological factor is undoubted. Whatever may be the true inwardness of internal squint, it is, in its incipency, unquestionably a functional affection to be cured by continued therapeutic paralysis of accommodation and by restoring the normal balance between accommodation and convergence by the use of convex lenses. But after the period of functional imbalance is passed, at about the sixth year of life, although the limit is subject to individual variations, and organic changes in the brain centers, in the ocular nerves or in the ocular muscles have set in, upon the nature of these changes depends the character of the surgical measure to be resorted to. The atrophy of the brain cells in the fusion center, or the loss of conductivity of the nerve fibres from the center to the

termination in the muscles is problematic and does not concern us in those cases capable of cure by operation. Our sphere of operation embraces the muscles only. If the excessive use of the accommodation enforces excessive use of convergence and disruption of the co-ordination of both, there must be either stimulation of the third nerves or loss of function of the sixth with corresponding increase of muscular response (power) of the interni and loss of muscular response (power) of the externi, or both. If the former, tenotomy of one or both interni is indicated; if the latter, advancement or resection of the externi. In accordance with Donder's theory tenotomy is the proper procedure and this operation has long been the popular one. Many cures have resulted and also many failures to cure. The causes for the failures have not always been those of technique. Operations carefully done by experienced men have been ineffective in cases of good vision in each eye. The blame has been laid on the absence of the fusion sense or loss of fusion power, and perhaps justly. The cause of the successes is the mechanical adjustment of the insertions by which the balance of power has been restored. Tenotomy in high grades of esotropia cannot be expected to bring about adjustment, at least permanently, because graduated section or even tenotomy of the entire tendon with preservation of the secondary insertions will give an under correction and a complete division of one or both interni will almost surely lead to divergence after some months have elapsed. We have all seen too many cases of this kind. Measurements of the degree of convergence do not give identical results, whether they are made by the perimeter or by the prismatic estimation of the distance separating the false from the true image, but slight deviations are not important factors in the determination of the operative method. My experience has led me to believe that the careful division of the whole tendon at its insertion, without interference with the secondary attachments is efficacious when the deviation is  $25^{\circ}$  or less. The operation of former times, the division of all the connecting fibres as well as the tendon should not be undertaken in any case. For degrees higher than  $25^{\circ}$ , double externus rectus advancement has been the operation that has proven most successful in my hands. Of all the procedures that I have tried, that proposed by Wootton is the most satisfactory. For details of the operation I refer to

his original paper. Several modifications of inserting and tying the sutures have been proposed and, while some have the advantage of easier withdrawal of the threads, the advantage is more theoretical than real, for the threads may remain indefinitely and should be removed when they become loose or are creating inflammation.

In deciding upon operation the factors to be considered are: is shortening of the externi superior in its results to lengthening of the interni, and, should we add to the strength of the weak or lessen the power of the strong? If tenotomy is based on the proper principle and is efficacious in curing esophoria and low grades of esotropia it seems logical to apply the same method to all grades irrespective of their degree. The objection to this reasoning is suggested by experience and sustained in a measure, at least, by theory. In the case in which either eye may be used for fixation, the eye used depending more upon accident than design, any operation conservatively done which will bring the visual lines approximately parallel, will pave the way for binocular vision; a result finally accomplished and retained only by the centers in the brain through the ocular nerves. It should be borne in mind that the fault is not in the muscles themselves which are in the beginning neither too weak nor too strong. We can attain our ends by muscular operations only because we bring the images of the two eyes within merging distance from each other. By mechanically changing the position of the retinal image nearer to the fovea we compel the brain to abandon its former practice of monocular vision and to substitute for it the unaccustomed exercise of its fusion power. It is possible that the proximity of the images to each other creates a power of fusion in some individuals; certain it is that it stimulates and develops it. By admitting this supposition we are able to harmonize our conflicting ideas and experiences and to understand how tenotomy may be the proper method in certain patients and advancement in others and how unskillfully performed operations of either kind must be unsuccessful. The third nerve theory, based on the relation of accommodation to convergence is correct but treatment based on it is sometimes wrong. Too much accommodation means too much convergence; equivalent to saying convergence is too strong and to cure it tenotomy is proper. The fact is that convergence is overstimulated while the muscles of convergence are of normal strength. Adduction is weakened but the externi are as strong

as ever. Restoration of co-ordination is the cure. This is accomplished in early life by atropia and glasses and later only by bringing the factors into closer relation so that by exercise and development of mental power co-ordination may re-establish itself. For these reasons I have abandoned tenotomy in high grades of strabismus and perform only Wootten's operation of advancement of the Landolt operation. The relative position of the eyes during the first few days after operation is rather suggestive of failure, the improvement is so slight and one feels as though tenotomy should be performed before the healing is complete. It is essential that both eyes should be bandaged for four days, the bandages removed once daily only for the purpose of cleaning the eyes. Subsequently under atropia or glasses the visual lines slowly become parallel. The conjunctival sutures may be removed at the end of a week, the deeper sutures allowed to remain for weeks or months. This operation is to be recommended provided, (1) The squint is concomitant, (2) That it exceeds  $25^{\circ}$ , (3) That the technique is closely followed, and (4) The eyes are bandaged for four days. The only failure I have met with in the last two years was in a young man in whom either the operation was not well performed or the suture became detached. In one case it succeeded after a tenotomy made three years previously by a capable operator had signally failed.

In the other class of hyperopic strabismus, namely, that in which amblyopia of one eye is present the Wootten advancement operation has not been in my hands successful. In these cases we are dealing with an entirely different proposition. We operate to cure the deformity, and we have given up the hope of the acquisition of binocular vision. The fusion center cannot be stimulated by the closer relation of the two images because the brain refuses to recognize the image of the amblyopic eye. The union of that blurred image with the other means confusion, so nothing is to be gained by it. The theories applicable to concomitant squint do not hold. Originally the amblyopia was as great a factor as the hyperopia in causing the squint and unless both causes may be removed we cannot hope to cure on the same lines of treatment. If the amblyopia can be cured the case will be brought into the category of concomitant squint and treated accordingly. The operations to be preferred in the amblyopic cases are, for the high grades, advancement of both externi and tenotomy of internus of squinting eye; for

the lower grades, advancement of externus and tenotomy of internus, both confined to the squinting eye.

2. Myopic external squint.

Confirmation of the theory elucidating the reasons for strengthening the weakness in preference to lessening the strength of the apparently too powerful muscular combination is furnished by the history of the development of the external squint of corrected high myopia or uncorrected moderate or low myopia. No claim has been made or justly can be made that the common form of functional divergence is the result of excessive power of abduction or a gain in the individual strength of the external recti muscles. With loss of accommodation and the mechanical obstacles to convergence incident to the lengthening eyeball adduction is diminished and lost and abduction becomes relatively greater. The power of rotation of each eye is preserved and the muscular structure remains unchanged until from disuse and the habit of turning the head to relieve the overburdened interni, the muscles atrophy. The methods of determining the arcs of rotation, as Howe terms them, furnish little or no reliable information as to the functions of divergence or convergence and can not safely be used as guides in the decision as to the nature of the operation. The perimeter measurements while probably as accurate as those of other instruments will define the degrees and the limitations of the power of rotation and their limitations, but we learn only their relative value. Strabismic eyes as a rule are capable of full rotation because the muscles are not faulty. Moreover, should we learn that the inward rotation is inferior in its arc to that of the outward rotation we are not justified for this reason alone in concluding that abduction is too strong and should be reduced by tenotomy of the externi, nor on the other hand, that adduction is structurally weak and that advancement of the interni is the proper operation. In considering the etiology and therefore the treatment we must go deeper than the eyes and study if we can the real sources of the loss of co-ordination. If high myopia is the cause the defect is deficient convergence, not relative but actual, in the presence of probably full muscular strength of each internal rectus or the average degree of inward rotation when the eyes are tested separately. External tenotomy, single or double, will increase temporarily, and, if the operation is extensive,



permanently, the inward arc by laming or destroying the outward arc and although the patient may be able to use his eyes better at the reading distance because the cornea has been mechanically turned inward the power of convergence is thereby not increased. Binocular vision at 14 inches means, as the result of tenotomy homonymous diplopia outside of that distance. With the correction of the optical defect, giving both eyes approximately equal vision, convergence may be restored and maintained by double advancement provided the images are thus artificially brought near enough to each other to stimulate to action the natural forces of fusion.

Convergence and divergence are extremely complicated functions. The more we have to do with them and their derangements the greater is our respect. We speak as though we had to deal with external and internal recti only and sometimes forget that every movement of the eyeballs concerns the stimulation and inhibition of antagonistic groups of muscles controlled by a complicated nervous apparatus, the intricacies of which no physiologist has been able to fathom.

## TO THE GENESIS OF CONJUGATE DEVIATION OF THE EYES.

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Since, in 1868, Prévost, in his classical treatise on the conjugate deviations of the eye, formulated the rule that the patient looks at his lesion, and since Landouzy and, almost simultaneously, Grasset found the opposite in the irritative form, viz., that the patient during the spasm looks away from his focus, it was the general view, that both these phenomena were to each other as hemiplegia to hemilateral spasm. A motor center of the lateral movements of the eye was assumed, corroborated by experiments on animals, from which associated lateral movements of the eye could be elicited by electric irritation of the cerebral cortex, and, from a series of post mortems, was located into the inferior parietal lobe or the angular gyrus, (Landouzy, Grasset, C. Wernicke, Henschen, von Monakow, Bernheimer, etc.)

To be sure, the experiments on animals showed, that the ocular movements, in contrast with the movements of the limbs, could be evoked from different places of the cortex. This would rather help for the explanation of transient deviation if, according to J. Roux<sup>1</sup>, 2 centers for the ocular movements are surmised, viz., a frontal sensitive-motor and an occipital sensory-motor center, whose lesion would produce a deviation of the eyes combined with hemiplegia and hemianopsia. These centers could substitute one another which would account for the rapid subsidence of deviation after apoplexy.

In 1904 Bard<sup>2,3</sup> in 2 papers attacked the generally accepted opinion, that the paralytic conjugate deviation be caused by paralysis of a motor center of the cortex. Bard contends that the paralysis of the supposed center is not sufficient to explain the deviation of the eyes, as a lesion of the cortical neuron cannot create a loss of tonus of the paralysed muscle. He explains the change of position by a unilateral sensory palsy, in which the automatic reflex motor impulses from the eyes, ears

and semicircular canals, reach the center of the oculomotor nerve of one hemisphere only. This unilateral motor impulse causes loss of equilibrium in the sensory centers of both sides and consequently deviation. The sensory disturbance, equally distributed over all centers of the hemisphere, does not depend on the seat of lesion, but on the intensity of inhibition, measured by the intensity of the apoplectic insult.

Bard brings especially the deviation in connection with hemianopsia, which perhaps constantly accompanies it and can be easily ascertained, while the one-sided paralysis of the acoustic and vestibular nerves always will escape the examination.

B. assumes a chiasm and semidecussation of the acoustic and vestibular nerves, analogous to the chiasm of the optic nerves.

This sensory theory has been disputed, especially by E. Portes<sup>10</sup> who, in a thesis under the auspices of Grasset, tried to show, that the connection between hemianopsia and conjugate deviation cannot be maintained, (1) because the deviation may occur in people born blind, (2) because there are cases of hemianopsia without this symptom, even at the insult, (3) because the deviation cannot be changed by altering the irritation for the healthy hemisphere, (4) on account of the defective parallelism between retrocession of hemianopsia and deviation, (5) an irritative conjugate deviation may pass into a paralytic, of opposite direction, which speaks for affection of a special center, (6) an isolated deviation of cortical origin of head and eyes may be observed separately (the clinical histories, quoted, are, however not very convincing). Deviation of the eyes to one side and of the head to the other may be encountered.

To this argumentation of Portes may be added, that the deviation cannot be elicited by reflexes from the acoustic and vestibular nerves, as these are not continuous, like the optic impressions, but cease if the head is kept immovable and if acoustic impressions are avoided. Most authors consider the reflex from the vestibular to the oculomotor nerve as a "low" reflex (Obersteiner<sup>9</sup>, p. 426, and Bernheimer<sup>4</sup>, p. 82). The symptom may be produced in monkeys by extirpation of portions of the brain whose irritation causes rotations to the other side (Bernheimer).

Hence there is no reason to abandon the motor theory of conjugate deviation from cerebral hemorrhages, but to attribute it to paralysis of the same center for the lateral movements of the

eyes, which on irritation elicits ocular movements in an opposite direction.

The starting point of Bard's theory, that the mechanism of the deviation cannot entirely be explained from such a paralysis, is certainly correct, although most authors scarcely recognize this difficulty and are satisfied to call attention to the preponderance of the antagonists through loss of tonus of the paralysed muscle or to a direct irritation of the center of the antagonists. However, it will be readily conceived, that the conditions do not admit of such simple explanation. The deviation from a simple peripheral paralysis of the abducens is not nearly as great, although the tonus of the external rectus must be minimal, certainly less than in conjugate deviation, in which the nucleus of the muscle is intact and one of the paralysed muscles, the internal rectus, still functionates as muscle of convergence and therefore has no reason for loss of tonus. Thus the preponderance of the antagonist does not suffice to explain the deviation from loss of tonus.

The assumption of an irritation on the innervation center of the antagonist, which being situated in the other hemisphere is so far from the focus that a constant direct irritation of the center seems excluded, is also difficult. In this case the influence on the antagonist must be attributed to the same point, whose lesion produces the paralysis, *i. e.*, by the interruption of a path, *e. g.*, between both innervation centers, respectively for movements to left and right each in its hemisphere.

This would be a center of inhibition which furnishes the probability of a 3d explanation, that the deviation is caused by cessation of restraint of the antagonist in the destroyed center, although there is no positive proof for it.

In a peripheral paralysis of the abducens the paralysed eye converges when the healthy eye looks straight forward. If the patient is asked to move both eyes forcibly in the direction of the action of the paralysed external rectus, the cornea of the healthy eye moves towards the inner angle, that of the paralysed eye towards the median line. The latter movement apparently is due not to the action of the paralysed external rectus, but, as generally supposed (A. Graefe<sup>6</sup>, p. 48), to lack of tonus of the antagonist, *i. e.*, a checking in the innervation of the antagonist by the innervation.

It is a general law, that the cortical centers of the brain lie

together according to physiological, not anatomical, principles. Therefore, it is not very probable, that the innervation, *e. g.*, for turning the eyes to the right would start from both hemispheres independently from one another, *viz.*, the innervation of the rotators to the right from the left side, and for the accompanying cessation of the innervation of the rotator to the left from the right side. The only natural interpretation of this complicated innervation is that the impulses for movement and inhibition originate at the same place, probably at the innervation center of the intended movement. In this case the checking might be imagined as passing the cortical center of the antagonist in the other hemisphere through the corpus callosum or another commissure, or directly to the nuclei.

Ch. Sherrington<sup>12</sup>, (p. 279), proved this experimentally. After cutting the right oculomotor and trochlearis nerves and electric irritation of the right cortex he produced rotation of the left eye to the left, while the paralysed right eye, on which only the external rectus acted, was also turned to the left, but only to the primary position in the median line (by cessation of the tonus in the external rectus). This inhibitory reaction could be evoked from the cortex wherever associated ocular movements may be elicited and from the corresponding places of the cornea radiata, the lenticular capsule and the splenium of the corpus callosum, where one might expect the commissure between both centers of the antagonists.

Thus we arrive by an entirely different way at the result, that it is a physiological necessity to assume an inhibitory impulse starting from the same place as the movement, *viz.*, from the place, whose lesion produces the deviation.

Another fact points in the same direction. Not many groups of muscles have in common with the lateral movements of the eyes that the muscle and its antagonists have their centers in the hemisphere of each. The abductors of the head and perhaps the muscles of the tongue are the only examples, which show such a relation between the antagonists. Here and in the abductors of the neck a marked picture of deviation is found in unilateral affections of the brain with suitable localization. This concurrence seems to indicate a connecting cause between the deviation and the great distance between the center of the muscle and its antagonists, just the condition which postulates

the assumption of a long and therefore interrupted inhibitory path.

Also the fact, that the deviation is sometimes very marked in comparison with the paralysis, seems more easily conceivable, if 2 paths are surmised, a path of innervation and one of inhibition, which are relatively independent of one another. As it is well known, the aspect of conjugate deviation of the eyes may also be encountered in cerebral affections outside the hemispheres. The cerebellar form is best considered as an irritative deviation (Bach<sup>1</sup> and Monakow<sup>8</sup>), since it follows the same rule as this (the patient looks away from his focus), and frequently is accompanied by irritative symptoms, unilateral convulsions, forced movements or positions even in other groups of muscles.

Deviation in affections of the pons (complicated by associated paralysis of fixation), the direction of which is to the same side, (in contrast to the cortical), as well as the eventually accompanying hemiplegia, is considered by Grasset as analogous to the general conjugate deviation, caused by the interruption of the same supranuclear path after its crossing in the median line in its course to the nuclear region.

Von Monakow and Uhthoff<sup>13</sup>, with greater justification, attribute the paralysis of fixation to the interruption of the pontine path (posterior longitudinal fascicle), while the deviation, which in only about 1-3 of the cases accompanies the paralysis of fixation (Uhthoff), is brought about by irritation of the same path in the other half of the pons. The symptom was observed in a tumor which destroyed one longitudinal fascicle and compressed the other, and a deviation without paralysis was seen to turn into a paralysis of fixation without deviation, as if the morbid process first irritated, and afterwards paralysed, the nervous path. This explanation, which was improbable on account of the more central paralyses of fixation, is here admissible, because both paths lie close to one another and because the spasmodic phenomena occur very rarely and thus by not too great constancy are not inconsistent with the assumption of an accidentally irritative action on another path from that which produced the paralysis.

I cannot see, why it should be less favorable, to search for a different explanation of the deviation, whether caused by lesion of the hemisphere or the pons. In other respects there is such



a vast difference in the causes of these disturbances of motility, that a principal difference in the kind of paralysis must be thought of, and in this case there is nothing peculiar to look for a different pathogenesis of the deviation.

Thus the conclusion seems justified to attribute the so-called paralytic conjugate deviation to a cessation of an inhibition of the center of the antagonists, originating in the destroyed center.

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## ETIOLOGY OF IRITIS.\*

(A Report of Five Hundred Cases.)

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We are indebted to the visiting staff of the Wills Eye Hospital for permission to report the following five hundred cases of nontraumatic iritis taken from their clinical records together with those of the late Dr. William F. Norris:

Table No. 1—ETIOLOGY OF 500 CASES OF IRITIS.

Cause.	No. Cases.	Percentage.
Syphilis .....	307	61.4
Rheumatism .....	127	25.4
Gonorrhea .....	26	5.2
Influenza .....	7	1.4
Exposure .....	7	1.4
Tuberculosis .....	6	1.2
Malaria .....	6	1.2
Child Birth .....	3	.6
Typhoid Fever .....	2	.4
Intra-Uterine Inflammation .....	2	.4
Diabetes .....	1	.2
Gout .....	1	.2
Pneumonia .....	1	.2
Cerebro-Spinal Meningitis .....	1	.2
Measles .....	1	.2
Lead Poisoning .....	1	.2
Rhus Toxicodendron Poisoning .....	1	.2
	500	100.00

From this table it appears that syphilis, rheumatism, and gonorrhea together caused 92 per cent. of the cases. Of the 307 syphilitic cases, 234 were males, 73 females. Both eyes were involved in 81 cases; but one eye in 226 cases; 14 cases occurred under twenty years of age, 119 cases occurred between twenty-one years and thirty years, 85 between thirty-one and forty years, 45 between forty-one and fifty years, and 21 cases over fifty years. Thus it would seem that the majority of the cases of syphilitic iritis occurred between the ages of twenty and fifty, the period of life in which syphilitic infection is most frequent.

A history of syphilitic lesions was elicited as shown in the following table:

\*Read before the Wills Ophthalmic Society May 3, 1909.

Table No. 2.—SYPHILITIC LESIONS IN 397 CASES OF IRITIS.  
LESIONS ELSEWHERE THAN IN THE EYE.

Chancre.		Secondaries.	
Date.	No. Cases	Date.	No. Cases
At time of Iritis.....	1	At time of Iritis.....	56
3 weeks before Iritis.....	2	2 weeks to 5 years before Iritis.....	34
1 month to 1 year before.....	49		
1 to 5 years before Iritis.....	64		90
5 to 20 years before Iritis.....	13		
Over 20 years before Iritis.....	7		
	136		
Tertiaries.		Syphilitic Growths on Iris.	
Date	No. Cases	Date.	No. Cases
Destruction of Soft Palate.....	1	Within 8 months after Chancre..	11
Gumma of Brain.....	1	Coincident with Secondaries on	
Gumma of Orbit.....	1	Body .....	10
		More than 1 year after Chancre.	4
		No other history of Syphilis....	9
			34

This tabulation is consistent with the commonly accepted view that syphilitic iritis is a secondary rather than a tertiary manifestation, since the iritis occurred within one year of the chancre in 52 cases, and was coincident with various secondary lesions in 56 cases. Thirty-four cases presented syphilitic nodules on the iris. Although such cases are generally called Gummatous Iritis, the majority of writers claim that the nodules are not true gummata, but are secondary lesions, papulosa or condylomata. This would seem to be the case in our series, since in 21 of the 34 cases, the nodules on the iris developed within eight months after the chancre, or else were coincident with secondary lesions elsewhere in the body. In one case forty days after the onset of iritis, the iris was entirely condylomatous. In only 46 cases, or 19.4 per cent., had there had been previous attacks of iritis, preceding the present attack by from two weeks to forty years; thus showing the comparative infrequency of recurrences in syphilitic, as compared with the rheumatic and gonorrheal iritis.

Posterior synechiae were noted in 151 cases, in 23 of which both eyes were affected, and in 128 cases, but one eye. In 6 cases the synechiae were broken in three days; in 8 cases in 2 months, and in one case, five months after the onset. Annular synechiae occurred in 11 cases.

Complications were noted as follows: Descemetitis in 14 cases, Keratitis in 13 cases, Hypopion in 4 cases, Vitreous opacities in 11, Optic atrophy in 3, and Neuro-retinitis in 4 cases. In one case Staphyloma of the sclera developed six months subsequently to the iritis.

Table No. 3—RHEUMATIC IRITIS.

Eye Involved	No. Cases	Age.	No. Cases
Both eyes	35	10-20 years	2
O. D.	45	20-30 years	23
O. S.	42	30-40 years	33
No record	5	40-50 years	28
		50-60 years	18
	127	60-70 years	14
		No record	4
Sex.			
Males	84		127
Females	43		
	127		

Duration of Iritis.	No. Cases.	Previous Attack of Iritis.	No. Cases.
Date.		Date.	
1 week or less	20	Past six months	6
2 to 4 weeks	16	Six to 12 months	4
1 to 6 months	10	1 to 5 years	24
1 to 3 years	5	5 to 10 years	15
	49	10 to 15 years	10
		34 years	1
		No date	10
			70

## RHEUMATIC ATTACKS IN RELATION TO IRITIS.

Time.	No. Cases.	Time.	No. Cases.
Now	22	5 to 10 years	14
1 to 6 months	7	10 to 20 years	9
6 to 12 months	3	20 to 30 years	6
1 to 5 years	18	34 years	1
		No date	7
		Total	87

Rheumatism, the second most frequent cause of iritis, was the etiological factor in 25.4 per cent. of our cases. These figures agree closely with other statistics, notably those of Norris and Oliver, who consider rheumatism the cause of iritis in 30 per cent of the cases. In regard to the relative occurrence of iritis in rheumatic subjects, Brunson<sup>1</sup> states that in 1500 cases of rheumatism only 23 cases of iritis or 1.53 per cent. were seen. In our series of 127 cases 84 were males, 43 females. Both eyes were involved in 35 cases. Table No. 3 seems to show that age is not an important factor in rheumatic iritis. It is the opinion of some writers that only those cases of iritis which are accompanied by acute multiple synovitis with fever can be properly classed as rheumatic. Moreover, Hutchinson<sup>2</sup> states that iritis in association with either acute or chronic rheumatism is a thing which we scarcely ever observe, cases so-called really occurring in connection with gonorrheal arthritis, irregular gout, secondary syphilis, or myalgia due to cold.

On the other hand, Paine and Poynton<sup>3</sup> have isolated a diplococcus, which they consider the specific cause of rheumatic fever, having found it in the anterior chamber of rabbits, and

1. Ophthalmic Record, Chicago, 1899, viii, Page 555.

2. E. Treacher Collins, International Clinics, Phila., 1893, iii., Pages 297 to 305.

3. Ophthalmic Year Book, 1904.

a similar diplococcus in various rheumatic joints. In our series, 10 cases gave a history of muscular rheumatism; and 55 of articular rheumatism, involving generally the larger joints. In a few cases only one joint was affected, but in the majority there was multiple joint involvement. Six cases gave a history of possibly mixed infection, 2 having had malaria, 4 gonorrhea. Recurrences were noted in seventy cases, presenting a striking contrast to the smaller number of recurrences as noted in the syphilitic table. The iritis was coincident with the rheumatic attack in 22 cases, while in 65 cases iritis followed the rheumatism at intervals varying from a few months to 30 years.

Posterior Synechiae were noted in 57 cases, in 20 of which both eyes were involved. In 6 cases the synechiae were broken in from 2 days to 3 weeks.

Table No. 4—GONORRHEAL IRITIS.			
Eye Involved.	No. Cases.	Age.	No. Cases.
Both eyes	1	18 to 20 years	2
O. D.	16	21 to 30 years	13
O. S.	9	31 to 40 years	6
	26	41 to 45 years	5
			26

URETHRITIS.	
Date.	No. Cases.
Simultaneously with Iritis	3
1 to 6 months preceding Iritis	2
7 to 12 months preceding Iritis	4
1 to 5 years preceding Iritis	7
6 to 10 years preceding Iritis	5
11 to 18 years preceding Iritis	5
	26

In each of the 26 cases classed as gonorrheal, a clear history of gonorrheal urethritis was elicited. Ten of these cases had had articular rheumatism, either definitely stated to be gonorrheal in character or occurring at such dates following the urethritis that it was most reasonable to consider the joint involvement to be due to gonorrhea. The hips, knees, ankles, elbows and small joints of the hands and feet shared in this involvement. The question has arisen whether or not gonorrhea produces an iritis without any intervening arthritis. Some writers claim that a joint affection always precedes a gonorrheal iritis. Opposed to this, are 3 cases quoted by Gendron <sup>4</sup> of an iritis appearing as a complication of gonorrheal urethritis, recurring without fresh urethral symptoms, and without any evidence of arthritis in any of the cases. Gendron considers these recurrences to be due to the action of toxins rather than to living gonococci, since the hypopion removed by paracentesis of the cornea in 2 of the cases contained no micro-organisms. In

<sup>4</sup> *Ophthalmologie Provinciale*, Vol. 1, Page 1.

our series, arthritis occurred between the date of the urethritis and the onset of iritis in only ten cases, leaving sixteen cases with no history of arthritis. All the gonorrheal cases occurred in males; 15 between the ages of 18 and 30; 6 between 31 and 40; the remaining 5 cases between 41 and 48 years of age. Table No. 4 shows that the urethritis existed at the time of the iritis in 3 cases, preceded the iritis by from one to twelve months in six cases, and that the longest interval between the urethritis and the iritis was 18 years. Eight of the 26 cases gave a history of 14 previous attacks of iritis, a much larger proportion than was shown in the syphilitic cases. In no case did a recurrence of urethritis accompany a recurrence of iritis.

*Influenza.* Seven cases, or 1.4 per cent., of our series gave a history of influenza. In 4 of these, iritis developed during the attack of influenza; in one case during convalescence; in one case the iritis had been chronic since the influenza and pigment deposits covered the anterior capsule of the lens; and in one case fifteen months after the influenza, iritis was present in a shrunken globe with a sloughing cornea. Four of the seven cases showed posterior synechiae which persisted after treatment.

*Tuberculosis.* Tuberculosis was the etiological factor in six cases, or 1.2 per cent. The patients were between the ages of 13 and 30 years; 3 were males, and 3 were females. In 5 cases the cornea was involved, seemingly secondarily to the iris. In 2 cases under observation at the present time, the nodules first appeared at the limbus, protruding from the anterior surface of the iris and encroaching on the cornea. With the further development of the nodules the cornea became more extensively involved, the growths appearing as small, irregular, lardaceous masses clustered in groups of two or three nodules with blood vessels accompanying them from the limbus toward the center of the cornea.

Since it is not always easy to prove the existence of tuberculosis as the causative factor in eye disease, it is interesting to note that one of the above group of cases received repeated injections of tuberculin subcutaneously with positive reactions both general and local, and later presented tubercular involvement of the lungs. Two of the cases are now receiving injections of tuberculin (Koch's Old) subcutaneously in the arm; they present a rise of temperature of from 1 to 3 degrees F., general malaise, a distinct increase in the photophobia, lacri-



mation, and conjunctival and ciliary congestion, with a further development of the nodules. With the subsidence of the reaction the eyes become less irritable and the nodules undergo partial absorption; and, on the whole, both the general and local conditions show improvement under treatment with tuberculin. One of the cases has, in addition to the kerato-iritis, an incipient pulmonary tuberculosis, with greatly enlarged cervical glands and tonsils. The other has trachoma in addition to the kerato-iritis. Four of the cases had tubercular lesions elsewhere than in the eyes; and in each of these four cases both eyes were involved.

*Exposure.* It is conceded that iritis may follow exposure to severe weather. While the clinical records contain a number of cases without definite discoverable cause in which the patient complained that he had "caught cold in the eyes," there were but seven cases, or 1.4 per cent., with clear history of exposure to wet or cold. Six of the seven cases were men, a ratio which might be expected from the greater liability of men to exposure.

*Malaria.* Of six cases, or 1.2 per cent., giving a history of malaria, 5 were men. The sixth case was a woman who was nursing a nineteen-months-old baby at the time of the iritis and had had malaria three weeks before. Two of the men were bridge builders who gave a history of exposure in addition to malaria.

*Child-Birth.* Three cases occurred in women who were nursing infants, without any history of definite cause. Both eyes were involved in every case. In one, the attack occurred immediately after delivery; in the second, six weeks; and, in the third case, three months after delivery. It is well known that many eye diseases may arise during gestation, confinement, and lactation. It seems reasonable that the prolonged tax on the woman's system as a result of pregnancy and child-birth may produce a lowered resistance which will allow some latent etiological factor to cause an iritis which would not have occurred had the woman been in her usual state of health. Syphilis must be considered as the possible cause here; and, with the increased knowledge of the part played by autointoxication in producing disease in pregnancy and the puerperium, and the certainty that autointoxication can give rise to iritis, we are compelled to think of this condition as a probable factor in iritis following child-birth.

*Intra-uterine.* Pre-natal iritis occurred twice (0.4 per cent.) This is of interest on account of its extreme rarity. Fisher<sup>5</sup> described one case as follows: Girl, aged 5 months, of Slavic parentage, brought to the Clinic January 5th, 1908. At that time the right eye was deeply injected; cornea much enlarged, giving a hazy gray reflex; pupil pin-head in size and irregular, but expanded to one-third maximum under atropia. Under anesthesia the cornea showed a bluish gray infiltration and a pinkish yellow mass filling the pupillary space, which assumed an irregular leaf-shaped appearance under reflected light. The mass was confined to the anterior portion of the lens capsule. There was a fair fundus reflex. In this case there was every reason to believe the condition to be due to a pre-existing iritis or general chorioiditis causing the cornea and sclera to become weakened, resulting in buphthalmos.

Risley's<sup>6</sup> case gave the following history: The mother had had four successive miscarriages. Father and mother were then given anti-syphilitic treatment. The fifth pregnancy resulted in a healthy child, without evidence of syphilitic infection, who died of diphtheria in a few years. The 6th pregnancy resulted in a healthy child who grew to womanhood without signs of syphilis. Father and mother now considered themselves cured and stopped anti-syphilitic treatment. The 7th pregnancy was the case in question, with bad eyes at birth, and seemingly blind when seen at the age of eight months. Both eyeballs were then soft, both presented annular posterior synechia, and the right pupil was filled with a gray exudate. The child wore a mercurial bandage for months. At two years of age O. D. was blind and hard and beginning to enlarge. O. S. had suffered from recurring attacks of pain and ciliary injection; its vision was light perception. At three years of age, an iridectomy was done on the left eye, after which vision improved and the eye remained quiet. Five years later the right eye was enucleated. Its antero-posterior diameter was 36 mm. Treatment was continued for three years. Three years later the sight of the left eye was again reduced to light perception and the girl was admitted to an asylum where she was classed as a middle grade imbecile.

Hutchinson states the average time at which infantile iritis

<sup>5</sup> Transactions of the Willis Hospital Ophthalmological Society, April, 1908.

<sup>6</sup> Ophthalmology, July, 1908.

shows itself to be about five months. It is an insidious disease involving one or both eyes, the cornea not often being affected; it is probably very often a part of the stigmata of inherited syphilis, as is shown in the second case of this series.

*Diabetes and Gout.* Diabetic iritis occurred in chronic form in one patient who had been bed-ridden on account of diabetes for ten months. Gouty iritis occurred once in our series. In this connection, it is interesting to note Hutchinson's<sup>7</sup> claim that almost all cases of diabetic iritis occur in patients who have had gout. While diabetes is by no means an uncommon disease in this country, gout is seen far less frequently here than in England. Hence, according to Hutchinson's view, the rarity of gout in this country would account for the rarity of both gouty and diabetic iritis in our clinics.

In the remaining seven cases, or 1.4 per cent., the following causes were discovered: typhoid fever in 2 cases; pneumonia, cerebro-spinal meningitis, measles, lead poisoning, and rhus toxicodendron poisoning, each in one case. The history of these various causative factors, though occurring but seldom, indicates the manifold etiology of iritis, and shows that the possibilities have not been exhausted when one searches for evidence merely of syphilis, rheumatism, and gonorrhea.

In conclusion, we would say that syphilis causes the majority of cases of iritis, rheumatism a large minority, gonorrhea a small minority, while other general systemic disorders, including acute infections, cause occasional cases; and we would suggest that an exhaustive inquiry into the past history of every case of iritis might elicit some of these rarer causes in cases which heretofore have been classed as idiopathic.

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7. Transactions of the Ophthalmological Society of the United Kingdom, Vol. 5, Page 12.

## ON THE VALUE OF OPHTHALMO-REACTION TO TUBERCULIN.

By DR. CHAS. ZIMMERMANN, MILWAUKEE, WISCONSIN.

After the discussion by the author before the Wisconsin State Medical Society at Madison, Wis., July 2, 1909.

For the peculiar phenomenon that instillation of tuberculin on the conjunctiva, devised for a diagnostic test by Wolff-Eisner, or on any place of the surface of the body according to von Pirquet, causes a reaction, although in most cases the tuberculous focus lies far away, Citron (*Berliner Klin. Woch.*, 1907, No. 36) gives the following explanation: The tubercle bacilli within the body produce a toxin which incites the cells to formation of anti-substances. The more toxin is introduced the greater is the formation of anti-substances and the affinity of the cells to the toxin. Whether this increased introduction of toxin is effected by bacilli or by tuberculin is irrelevant. Recent investigations have shown that all cells of the body, not only those close to the tuberculous focus, have the property of forming anti-substances if there is somewhere an active tuberculous focus, be it ever so small. If in such an organism an inundation with toxin at a certain point takes place by the application of tuberculin, at first the local tissue cells will produce anti-substances in an increased measure and combine with the toxin. Then the free cells in blood and lymph, chiefly the leucocytes and lymphocytes, which also have the faculty of producing anti-substances, will gather from all sides to assist in the neutralization of the toxin. Thus the local inflammation is established. That this local reaction may also be produced by any bacterial toxin in the corresponding disease has been shown by Chantemesse in the ophthalmoreaction in typhoid by using extracts of typhoid bacilli.

Recent investigations of Stanculeanu (from the Eyeclinic in the University of Bukarest, *Klin. Mon. für Aug.*, April, 1909, p. 422) on the pathological anatomy of ophthalmoreaction of the conjunctiva, excised 24 hours after positive reaction to 2 drops of tuberculin 1/100, showed as the most striking feature the enormous thickening of the subepithelial layer, caused by increase of the fixated tissue cells and leucocytes. The upper

zone is characterized by larger lymphatic spaces filled with edematous fluid, polynuclear and large mononuclear cells. The blood vessels are ectatic and choked with red blood corpuscles, the endothelium of the capillaries is thickened and they contain mono- and polynuclear leucocytes. The epithelium is in a state of opaque swelling; some cells are very much enlarged and edematous. In short, it is an acute conjunctivitis with predominance of mononuclear cells and lymphocytes, no tubercle bacilli.

O. Stuelp (*Klin. Mon. für Aug.*, March, 1908, p. 204) found microscopically the nodules of the conjunctiva, which he observed after ophthalmic-reaction to be caused by an accumulation of round cells under the infiltrated epithelium. At some places the infiltration was grouped around a small cavity (enlarged lymphatic vessel?). The microscopic structure of the nodules was similar to that of small phlyctenes, at one place to an epithelioid tubercle. This is analogous to Dael's findings, and may be interpreted that the toxin or the fragments of the bacilli may produce a histological change approximate to tuberculosis, which, however, is not able to spread. Thus the nodules developing after ophthalmic-reaction have partly an inflammatory, respectively phlyctenular, partly tubercular, structure.

Ophthalmic-reaction, as to clinical value compared with other local reactions, cannot be considered as absolutely reliable, and its employment requires certain conditions. For instance, more than 1,000 observations have been made by Calmette and his pupils, which tend to show that the reaction may be demonstrated in all forms of tuberculosis, unless the patient be moribund or nearly so (*Gazette des Hop.*, Aug. 8, 1907.) Baldwin (*Journal of Am. Med. Assoc.*, Feb. 20, 1909) says in his conclusions from 1,087 conjunctival tuberculin tests by a uniform method: "It is noteworthy that fully 70 per cent. of persons who had been healed in the clinical sense from two to thirty years reacted positively. The chief interest relates to the clinically incipient (71.4 per cent. positive) and suspected cases (33.3 per cent. positive), in which the test would be expected to assist in diagnosis. The results fall considerably short of the requirements for an ideal diagnostic method in suspected tuberculosis, though relatively good in confirmation of the clinically tuberculous cases. The percentage of supposedly healthy subjects and patients with non-tuberculous diseases reacting positively closely accords with that found by Wolff-Eisner and

Petit in a larger number of cases." In the *New York State Journal of Medicine*, October, 1907, he remarks: "The figures with supposedly healthy people are not different from those obtained with the cutaneous test (von Pirquet's), but idiosyncrasies must possibly be considered as playing some part in causing reactions until further experience and postmortem observations shall establish the limits of specificity." F. Koehler (*Deutsche Med. Woch.*, 1907, No. 50, p. 2082) infers that in pulmonary tuberculosis the ophthalmo-reaction is rarely negative, but it is not certain whether it may be considered as a safe, especially early, diagnostic test. About 95 per cent. of patients with tuberculosis of the lungs gave a positive reaction; its percentage must be studied on a large material of non-tuberculous individuals. *Positive reaction* speaks with very great probability for tuberculosis. *Negative reaction* does not absolutely speak against tuberculosis, since 50 per cent. of S. Cohn's patients affected with severe phthisis did not react (*Berliner Klin. Woch.*, 1907, No. 47, p. 1507). From a series of experiments in cattle McCampbell and White (*Jour. of Exper. Med.*, March, 1908) conclude that the question of relationship of intensity of reaction to the number and severity of tuberculous lesions, that of comparative accuracy, and the possibility of deciding by the reaction how far the tubercular process has progressed in the body, have still to be determined. Out of 1,500 cases, collected by Krause and Hertel (*Med. Klinik*, 1908, No. 4, p. 117), from literature, tuberculous patients reacted in 80 per cent., suspected in 50 per cent., free from tuberculosis in 40 per cent. With this corresponds the reaction in 6 out of 8 suspected cases of Stuelp, *i. e.*, in 75 per cent. and out of 6 other cases 3, *i. e.*, 50 per cent. As the ophthalmo-reaction is much more severe in a diseased than in a healthy conjunctiva, a slight follicular catarrh or a chronic conjunctival catarrh without distressing symptoms to the patient, may be overlooked and wrong conclusions may be drawn from the intensity of reaction (Waldstein, *Klin. Mon. für Aug.*, 1908, I, p. 291).

Theoretically one would expect that the reaction must occur in any tuberculous patient, even if there is no noticeable focus. But this cannot be so simple, because we do not know whether all tubercle bacilli form a uniformly composed toxin, or whether there are not individual differences. Then the quantity or concentration of the toxin, in order to produce a reaction, must vary in each individual according to the greater or less im-



munity the body possesses from the production of the toxin by the focus. Thus some persons reacted very intensely to 1 per cent. solutions, others very slightly to 4 per cent. solutions (C. Brons, *Klin. Mon. für Aug.*, 1908, I., p. 62). As a technical disadvantage Collin (*Med. Blätter*, Feb. 15, 1908) points out that children and very sensitive adults forcibly compress the eyelids after a drop of tuberculin is instilled, expressing thereby a good deal of the fluid, thus preventing its absorption. The amount absorbed cannot be properly estimated. He, therefore, advises a preliminary instillation of a 3 per cent. cocain solution.

As a subcutaneous injection of tuberculin, made some time after the instillation, is apt to reproduce the local reaction on the eye or induce it, if it did not occur before, and, on account of its cumulative effect, ophthalmic-reaction cannot be applied if the case is to be subjected to therapeutic injections of tuberculin.

The diagnostic value of ophthalmic-reaction in *ophthalmology* may be best understood from a splendid exposé of C. Brons from the clinic of Prof. Th. Axenfeld at Freiburg i. Br. (*Klin. Monat. für Aug.*, 1908, I., p. 60). In 9 out of 24 suspected eyes, the ophthalmic-reaction was positive, the probatory injection of tuberculin in 14. The latter never failed when the ophthalmic-reaction had been positive. Positive ophthalmic-reaction allows of the conclusion that somewhere in the body a tubercular process is active. Positive reaction in disseminated chorioiditis, iritis, scleritis, parenchymatous keratitis, which clinically and anatomically have nothing characteristic, but may be produced by tuberculosis (according to the experimental investigations of W. Stock), does not indicate with certainty their tuberculous nature, as they may be of different etiology (syphilis, or the introduction of fermentation fungi into the circulation, as shown experimentally by Stock). The possibility of the presence of another tuberculous focus, eliciting the positive ophthalmic-reaction, can never be excluded, which, as it frequently happens, cannot be diagnosed.

The *degree* of reaction does not indicate the tuberculous nature of the eye affection, else only tuberculous eyes would give a severe reaction. This, however, is certainly not the case, since perfectly healthy eyes may give the very severest kind of reaction.

The question: Is there a *local* reaction on the eye in the

same sense as it may occur after the subcutaneous injection, is answered in the negative, as in most of the diseased eyes, examined by Brons, the reaction was limited to the conjunctiva. Franke (Brons, p. 71), who examined 24 eye patients and observed intense reactions, never saw a participation of the diseased parts, not even in undoubted tuberculous affections, *e. g.*, tubercles of the iris. There are, however, some cases published in which it could not be excluded, by Auberet and Lafon, Kalt, and 4 cases of Brons. From this Brons concludes that the tuberculous nature of an eye disease cannot be inferred from the course of the ophthalmo-reaction. If it is severe, or if the diseased parts participate in it, tuberculosis is probable; if it is mild, it is no proof against tuberculosis. If the subcutaneous injection is followed by a positive general or local reaction, the ocular affection is certainly tuberculous. Here lies the advantage of the subcutaneous method, which is given preference by Brons, as well as by Morax, Kalt, and, at the congress of Rhenish-Westphalian oculists, Feb. 7, 1909, at Duesseldorf (*Klin. Monat. für Aug.*, 1909, March, p. 317), by zur Nedden, who rejects ophthalmo-reaction for ophthalmological purposes, and by Stuelp and Stoewer. Brons gives preference to the subcutaneous injection because it acts more certain, eventually determines, through local reaction, the tuberculous character of a suspected eye infection, and such bad complications are not observed, in spite of high temperatures, if the original directions of Koch are adhered to. Nance and Swift (*Jour. Ophthal. and Oto-Laryng.*, Feb. 1908, ii., 43) also state that the ophthalmo-reaction does not necessarily indicate a tuberculous etiology of an eye disease, as the tuberculous focus may be in some other part of the body.

Numerous observations of *damages* to the visual organ following the instillation of tuberculin, not only to diseased eyes, but to perfectly healthy eyes, clearly demonstrate the dangers of ophthalmo-reaction. In 6 cases of Brons the clinical aspect was intensely aggravated by the tuberculin and the healing protracted. Kalt saw in an eye, affected with chronic iritis and scleritis which for two months had been without irritation, severe exacerbation of the scleritis, ending in sclerosis of the cornea and permanently reducing the sight to perception of light. Ramsay (*The Lancet*, March 7, 1908) observed serious impairment of vision from a considerable opacity of the center of the cornea; Terrien a

nodular conjunctivitis lasting for months. A. Leber, Netter, Comby, Rénon, Collin, Brawley, Waldstein, Stuelp, Trousseau, Brunetière, Thompson, and others, share, from their experiences, the opinion of Pes that the ophthalmo-reaction may be of great danger to the eyes. Schiele (*Woch. f. Therap. u. Hyg. des Aug.*, Dec. 5, 1907) found that in eczematous and trachomatous conjunctivitis the inflammatory reaction which has followed the installation of tuberculin may excite a fresh crop of phlyctenes, as well as trachoma follicles, which may involve the entire conjunctiva. Wolff-Eisner, the originator of ophthalmo-reaction (*Deutsche Med. Woch.*, 1908, No. 10, p. 444), contends that although the eruption of phlyctenae in scrofulous patients has been observed after the conjunctival and cutaneous tests, conjunctival affections admit of his method, but tuberculous eye affections, especially of the uvea, give a contraindication. If ocular tuberculosis is suspected, one ought to commence with solutions of tuberculin of 1:100,000, then 1:10,000, and, at the third instillation, 1:1000 ought to be used.

Serious complications in so far perfectly *healthy eyes* were observed by a number of authors, *e. g.*, violent phlyctenular inflammations in adults and children by Schenk, Seiffert, Eppenstein, marginal ulcers of the cornea which may lead to perforation, vaccine tuberculosis of the conjunctiva, by Collin (*Med. Blätter*, Feb. 15, 1908), formation of follicles in the palpebral conjunctiva, of nodules in the ocular conjunctiva, by Stuelp, severe keratitis by Barbier, tuberculous keratitis by A. Knapp (*Archiv of Ophth.*, 1908, p. 171). Waldstein (from the eyeclinic of Prof. A. Elschsig in the German University of Prague, *Klin. Mon. für Aug.*, 1908, I., p. 285) warns against general employment of ophthalmo-reaction, as it may, in predisposed individuals evoke a serious disease of the eye, which will not always heal without permanent damage. Stuelp (*Klin. Mon. für Aug.*, 1908, I., p. 292), who confirms the diagnostic uncertainty of ophthalmo-reaction, observed in 9 out of 14 eye patients with, or suspected of, tuberculosis after instillation of tuberculin intense inflammation, lasting over 7 weeks, on eyes which formerly had been inflamed, but were at the time of instillation perfectly free from irritation, for a shorter or longer period, and on eyes which never had been diseased when the other eye was or had been affected. He urgently warns against its employment in ophthalmology, and concludes with the very appropriate remark that we must aim

to cure our patients from their diseases for which they consult us and not inflict upon them new anxieties, distress and disabilities.

In view of these experiences ophthalmo-reaction cannot be recommended, and if the subcutaneous injection of tuberculin is not desirable, the cutaneous method of von Pirquet may be tried, which in the very beginning of tuberculous infection, especially in early childhood, is of inestimable value. Poter and Griemert (*Deut. Medizin. Woch.*, 1909, M. 22, p. 793) just now reported their investigations with von Pirquet's test on 53 infants at the ages of from 1 to 14 days. Not one of them showed a trace of reaction. This corresponds with the general experience that tuberculosis is exceedingly rare in infants, in proportion to the millions of children that are born every year or the thousands that are found free from tuberculosis at autopsies, save in generalized affection of the mother, and then only very exceptionally. The authors conclude that negative reaction to Pirquet's test, especially if repeated a second time, with pure tuberculin occurs only in people perfectly free from tuberculosis, as the new born are. The positive reaction, even if only slight or belated or at the second test, indicates a tuberculous focus in the body which, however, need not be active or progressive. On account of its sensitiveness, the cutaneous test apparently indicates every, even the most harmless, focus of tuberculosis, and therefore is not sufficient for the diagnosis of active tuberculosis.

For the diagnosis of ocular tuberculosis Stuelp recommends von Pirquet's test. If this is negative, the subcutaneous injection is not necessary. If in smaller children it is positive, active tuberculosis is indicated. Positive reaction in older children and adults requires subcutaneous injection for the diagnosis of active tuberculosis. E. Török (*Archives of Ophth.*, 1908, p. 541) considers subcutaneous injection of old tuberculin one of the best and most reliable diagnostic agents and believes that, when a patient's eye disease suggests tuberculosis from other circumstances (age, clinical picture, heredity, etc.), and a typical general reaction is present after administering small quantities of T. V. (not exceeding 5 mg.), we can positively make the diagnosis of tuberculosis, even when we do not get local reaction in the eye itself.

## A SPONTANEOUS SEROUS CYST FLOATING FREE IN THE ANTERIOR CHAMBER.

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CASE REPORT.

On the 6th of December, 1905, Miss L. C., 21 years old, came to the ophthalmological clinic at the Hotel-Dieu. She complained of ocular fatigue at her work, dressmaking, and called attention specially to her right eye, which was weaker than the left.

*Present Condition.* Examination of the left eye in oblique light showed a slight pannus on the superior part of the cornea. Save for certain granulations in the cul-de-sac of the upper lid, the rest of the eye and its adnexa were perfectly normal.

More interesting was the condition found in the right eye. The first striking observation was the presence of a small cyst in the anterior chamber. The tumor was not perfectly round, but rather flattened in the antero-posterior direction, and measured about two and a half millimetres in its widest, and one and a half in its narrowest diameter. It was transparent, and a careful examination with Hartnack's glass allowed us to see that its capsule was greyish, dotted with pigmented spots, and traversed by small muscular fibres in the form of brown ramifications. The most remarkable feature in the case, which is perhaps unique, was that the cyst had no pedicle, but was entirely free in the anterior chamber. In fact, if the head of the patient was thrown forward quickly, the cyst could be seen to move upwards. The examination of the cornea showed small opacities, as well as a slight pannus. The posterior part of that membrane was transparent and had undergone no change from its contact with the cyst. No trace of traumatism, or of perforation was present. The fluid of the anterior chamber was clear, and the iris was of the same brown color as that of the left eye. The iris bore well the frictions of the cyst-wall, and showed no inflammatory reaction. Contraction to light was normal, and there were no synechiae. Dilatation was normal, and was not influenced by any reflex irritation. No pupillary membrane was present. The lens was perfectly transparent and the anterior lens-capsule had no pigmented areas.

After instillation of homatropine and cocaine the fundus of the eye was examined and found normal. Ocular tension was

not increased. Examination of the upper lid showed a slight trachomatous infection.

The refraction gave the following result:

$$\begin{array}{l} \text{R. E.} + 1. - 3.75 \quad V = 1/3 \\ \text{L. E.} - 0.50 \quad 30^\circ \quad V = 1 \end{array}$$

Perception of color in both eyes was perfectly normal, as well as the fields of vision and the accommodation. There was no muscular asthenopia.

*Personal History.* The patient said that one morning in January, 1898, she had noticed for the first time the presence of a small tumor in the right eye. The cyst caused no pain, and nothing else was noticed on that day any more than previously. Since that time it had not increased in size, and always preserved the same shape. The patient had not been incommoded by any inflammatory lesion caused by the tumor. She complained that on resuming the upright position after having bent her head forward, her right field of vision was obscured during the space of a few seconds. No history of ocular trauma was observed. The patient was not the subject of any diathesis and enjoyed excellent health; the only illness she had had was smallpox at the age of four. It was as a result of this illness that the right cornea was affected, following which the slight opacities remained. These opacities of the cornea amply explained the vision of 1/iii., especially with a mixed astigmatism.

As to the trachomatous lesion, she had never suffered therefrom and could give no explanation of it; she was even surprised when we gave her hygienic advice regarding it. There was no history of intestinal worms.

Her hereditary antecedents showed nothing of interest, nor could anything bearing on her case be elicited.

The diagnosis of spontaneous serous cyst was made, for it was evident that we had not to deal with the sac of a cysticercus, or any solid tumor. Energetic treatment for the granular conjunctivitis was proposed for the purpose of preparing her for a removal of the cyst. Not only did she refuse operation, but even medical treatment, and she returned to her home with an order for glasses. On her return sometime later she reported that she was well and perfectly satisfied with her glasses.

We have thought this communication interesting because we have not found similar cases in medical literature. Unhappily, this observation is not as complete as we could have wished, since there was no microscopic examination of the cyst in view of the refusal of the patient to allow operation. In view of the history of the condition, the cyst having suddenly appeared in



the anterior chamber, we may be allowed to put forward a hypothesis to explain its presence in that situation. It is not the intention to make a long dissertation to support or refute the different theories of the formation of cysts of the iris.

Schmidt-Rimpler believes that most frequently they are formed by a crypt whose opening is obliterated and whose cavity is filled by a liquid similar to the aqueous humor.

Mackenzie and Bowman think that it arises from the presence of a fluid secreted between the muscular coat of the iris and its posterior epithelium.

According to de Wecker, these tumors are the result of a simple infolding or saccular deformity of the iris.

In our case, it should not be forgotten that we have here a spontaneous cyst, for there is no history of traumatism. It has assuredly developed in the posterior chamber, either upon the ciliary body or on the posterior surface of the iris. Treacher Collins has published observations with microscopic examinations of spontaneous serous cysts, adherent, which have developed on that posterior surface underneath the normal pigmented layer of the iris.

It is today admitted that the lining membrane of these cysts is not always composed of epithelium. In fact, the researches of Ch. Robin upon the subject show that sometimes the wall of a cyst of the iris does not possess epithelium, but only a material composed of fine fatty granules with a small number of pigmented cells.

According to the same author, the wall is formed by the tissue of the iris, which seems to be doubled upon itself to give origin to a cavity. This opinion is also shared by Bowman.

In our patient if this cyst has developed as have those reported by our English colleague, if it has formed itself at the expense of the ciliary body, or even of the posterior part of the iris according to one theory, it is not the less true that it has had at some time a pedicle. This must have been filiform; and eight years ago, under the influence of some cause which cannot be determined, it has broken away from its point of attachment. Once free, the cyst being squeezed in the posterior chamber, has naturally passed into the anterior chamber by the pupil. Very careful examination shows its anterior wall to be a little less convex than its posterior, and leads us to suppose that the pedicle was upon the posterior surface. The cyst, during the eight years it has lain in the anterior chamber, preserves its consistence by the renewal of its liquid contents,

at the expense of the internal granular layer. Its external wall, surrounded by the aqueous humor, furnishes it by endosmosis with the elements necessary for the maintenance of its vitality. Thus its appearance is always the same and the iris, being accustomed to its contact, is not irritated thereby. If it will always be so remains a question.

Such is the hypothesis we advance on the subject of this mobile cyst in the anterior chamber, a condition so interesting by reason of its extreme rarity.. Once more we express our regret at not having been able to operate upon this case and our consequent inability to present a microscopical report of the tumor with the clinical details.

## ***Abstracts From Recent Ophthalmic Literature***

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### **AMBLYOPIA AND BLINDNESS.**

THE NEW BASIS OF WORK FOR THE BLIND.—BISHOP, SAMUEL H. (*The Century Illustrated Monthly Magazine*, May, 1909), describes the beautiful buildings and surroundings of the school for the blind at Overbrook, Pa. The methods of teaching are in accord with the new education everywhere. The Improved Braille is preferred. The fundamental motive in the teaching is the appeal to the motor centers, since blind children lack the main agent of observation. Mr. Edward Allen and his corps of teachers carefully consider the industrial capacities and inclinations of the pupils, and though each pupil is required to learn to do something practical with his hands, care is exercised to preserve for him such talents as he may have or be able to acquire for wider selection of his vocation in life. The first recognized educator of the blind in this country was Dr. John Dennison Russ, born in 1801, at Essex, Mass. In 1831 he aided in securing an act by the legislature of New York providing for instruction of the blind. In 1832 he began the teaching of three blind boys in the almshouse, that being the first attempt of the kind in America. The number of the class increased rapidly, and the autumn of that year the New York Institution for the Blind was founded. The wide scope of the work at Overbrook is described, also that of the New York Association for the Blind.

M. D. S.

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### **ANOMALIES.**

A CONGENITAL CONNECTIVE-TISSUE FORMATION IN THE VITREOUS, PROBABLY ARISING FROM THE OPTIC NERVE.—HANSELL, H. F., Philadelphia (*Arch. Ophth.* May, 1909, xxxviii., 259), reports a case of the above congenital defect present in a patient aged 16 years. The author describes the mass as present at the base of the globe and overlying the optic disk and slightly movable, laterally, with the movements of the eyeball. The mass was white in color, and extending out from each side near the top of the mass were white fibrous bands accompanying the vessels, these bands disappearing in the

retina. The summit of the mass was non-vascular. The growth extended 4 D. from the fundus, projected forward into the vitreous, and was attached posteriorly to the sheath of the optic nerve. A portion of the mass was vascular.

The author believes it to be a congenital growth in the vitreous springing from the optic nerve sheath and vascularized by fine vessels from the disk. He refers to some cases reported by Randall in 1888 which somewhat resembled his and which, he believes, belong to the same class. W. R. M.

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### BACTERIOLOGY.

SPOROTRICHIASIS OF THE VISUAL APPARATUS. — MORAX (*Annales d'Oculistique*, May, 1909).

The primitive infection of the conjunctiva to the sporotrix is shown clinically by follicular lesions, accompanied by ill-defined yellowish patches, a sensation of discomfort and a well-marked adenopathy.

The palpebral infection appears to affect the type of ulcerous folliculitis with inflammation and thickening of the lid margin, and is also accompanied by adenopathy.

The diagnosis is easy by placing scrapings from the patches or ulcerations in appropriate media in a temperature between 20° and 37°.

In all the observed cases the parasite had the character of the sporotrichum Beurmanni.

The etiology is obscure. If it is true that the sporotrix exists very generally and even on the surface of normal mucous membranes, it will be important to discover under what conditions it can penetrate the epithelial barrier and proliferate in the tissues. One of the reported observations shows that such penetration is possible without solution of continuity.

G. C. H.

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BACTERIOLOGY OF THE CONJUNCTIVA. WEAVER, E. M., Akron, Ohio (*Ohio State Medical Journal*, June 15, 1909). It is generally conceded that the different forms of staphylococci and streptococci are frequently present on the normal conjunctiva; pneumococci, diphtheria bacilli and in very rare instances the Koch Weeks bacilli, the diplobacilli of Morax Axenfeld

and even gonococci have been found. The study of the many forms of conjunctivitis shows that conditions, clinically undistinguishable, may be produced by different organisms and that it is not possible to specify any definite microorganism as the cause of a given clinical type of inflammation. In addition to ordinary methods of spreading contagion, the conveyance of infection through the air, either mixed with dust, or in fine drops in diseases accompanied by coughing and spitting, is mentioned, also the carrying of secretion by flies. Gram's method of staining is considered most satisfactory. The microscopic appearance, staining properties, cultural characteristics, and clinical manifestations of the organisms most commonly found in the eye are described.

M. D. S.

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ANOTHER CASE OF MENINGOCOCCUS CONJUNCTIVITIS. McKEE, S. HANFORD, Montreal (*Ophthalmic Record*, June, 1909). In addition to the six cases reported in the *Record* last September, the author now reports an additional case of a girl of 13 years who was suffering from epidemic cerebro spinal meningitis. She had a definite catarrhal conjunctivitis. Inoculations were made from the eyes upon blood serum and hemoglobin agar and 24 hours later examined. A gram negative diplococcus was obtained in pure culture and had all the characteristics of the meningococcus.

M. B.

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INFECTION OF THE VISUAL ORGAN WITH THE INFLUENZA BACILLUS. ROSENHAUCH (*Weiner Medizinische Wochenschrift*, Jan. 30, 1909).

The author reports 5 cases of disease of the eye due to the influenza bacillus. In 3 cases there was suppurative conjunctivitis; these healed up in two weeks, by applications of nitrate of silver. The fourth case was one of subconjunctival abscess produced probably by a metastatic process. The patient in this case, in the course of a general infection of influenza, developed an inflammation of the frontal sinus, which was followed by a retro-bulbar abscess; after an incision into the abscess, the eye healed up without any loss of vision. In the fifth case, the bacilli were found in the anterior chamber of the inflamed eye, which had shrunken from the disease.

J. G.

**CATARACT.**

THE EXPRESSION OF CATARACT IN ITS CAPSULE—WITH REPORT OF FORTY OPERATIONS.—WÜRDEMANN, H. V., Seattle, Wash. (*Jour. Amer. Med. Assn.*, Sept. 4, 1909). W. credits the capsular operation to A. Pagenstecher, who first deliberately performed it in 1865. Historical references follow, mention being specially made of the work of Major Smith with the criticisms thereof. The instruments are described and also the variations, both in instruments and in methods employed by various operators. A  $\frac{2}{3}$  corneal incision with conjunctival flap and extraction in the capsule for all immature or hypermature lenses and extraction with capsulotomy for all mature lenses are the operations of choice. Discussion in children is best. It is no operation for the beginner or even for the average operator. A minute description of the operation follows with case histories and a table showing the type of cataract, complications, loss of vitreous, disposition of capsule, number of instruments entering eye, form of incision, etc. Results in patients living under our conditions in our country are necessary to determine the final place for this operation. H. V. W.

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THE EXTRACTION OF THE LENS IN ITS CAPSULE (SMITH'S OPERATION) BY DIVISION OF THE SUSPENSORY LIGAMENT. — NESFIELD, CAPTAIN, I. M. S. (*Indian Medical Gazette*, July, 1909), has found expression in the capsule difficult to perform, and dangerous, as a persistent attempt in a stubborn case leads to escape of the vitreous. He says that in every case of cataract he has tried to perform it, but has only succeeded in about one in every ten cases; that is, in nine cases out of ten he has been afraid to use sufficient force. To overcome the difficulty of rupturing the suspensory ligament, he hit upon the idea of dividing it. "Having made the incision and done the iridectomy, a cystitome is passed between the iris and the lens till its point is well beneath the iris and beyond the circumference of the lens in its capsule. The instrument, which has been passed with its cutting point directed outward, is now turned so as to divide the suspensory ligament. The point is swept round the circumference of the lens so as to divide the union, lower and outer portions of the ligament." The cystitome is removed with its point turned sideways. The lens with its capsule is found to be free on three sides; a very little pressure

will deliver it. Should the upper portions of the ligament resist, the presenting lens should be seized with fixation forceps. This ruptures the capsule, which is in greater part carried away in the forceps, while the lens is very readily delivered. No illustrative cases are given. F. P. M.

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EXTRACTION OF SENILE CATARACT WITHIN THE CAPSULE.—EELSCHNIG, A., Prag. (*Archiv für Augen.*, 63, 1909, p. 189), performed, out of 264 extractions of senile cataract, 63, according to the method of Major Henry Smith, within the capsule, 34 with, 29 without, iridectomy (from October 1st, 1907, to February 1st, 1909). Out of the 34 simple expressions the capsule ruptured in 5, in 3 the lens had to be extracted with the spoon, in 6 vitreous prolapsed, in 2 vitreous entered the anterior chamber after expression of the lens; *i. e.*, prolapse of vitreous occurred in 17.6%, rhexis of the hyaloid membrane in 23.5%. Prolapse of iris occurred on the first day after expression in 12 cases, *i. e.*, in 35%. No eye was lost, in 9 the result was fair (0.2 to 0.1 V), in the remaining cases very good.

A comparison with his 136 simple extractions without the capsule shows the great superiority of the latter. E.'s experience with expression after iridectomy was not better. He thinks that the operator cannot regulate the exit of the lens with its lower or upper border first.

Prolapse of vitreous may happen before presentation of the lens or vitreous visibly follows the traction of the lens. E. found that the posterior capsule is more or less adherent to the hyaloid membrane, so that the vitreous is pulled forward with the extraction of the lens. The expression of the lens without prolapse of vitreous seems to depend upon the possibility of detaching the lens from the membrane in the hyaloid fossa. This, however, is absolutely independent of the kind of cataract, excepting partial cataracts in youthful individuals or in brunescant, or Morgagni's, cataracts. The rupture always occurred in the posterior capsule, which in very old people and in hypermature cataract is extremely thin.

The consistency of the lens seems to give no predisposition. Eyes with small corneæ, of 9.5 mm. diameter or less, furnish a contraindication for expression, as the diameter of the lens is too large to be easily delivered through a section even larger than two-fifths of the border.



In several cases infiltrations of the cornea developed, not from infections, as only xerosis bacilli were found, and E. thinks that he better had omitted the cauterization in these cases.

Detachment of the chorioid was relatively frequent.

E. attributes the better results of Smith to individual or racial peculiarities, and quotes Hirschberg's observation that the average age of Indians operated on for cataract is 40, in Germany 62. E.' technic cannot be accused, as out of his first 13 expressions the capsule ruptured only in 1.

In summing up, E. absolutely denounces simple expression on account of the frequency of prolapse of iris. It must be reserved to cases in which iridectomy is intended from the start. Here it is only justified, if one does not insist on finishing it under all circumstances, but if one opens the capsule if careful attempts at pressure do not affect the presentation of the lens.

C. Z.

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THE CATARACT IN-CAPSULE EXTRACTOR AND THE NEW ESSENTIAL STEPS OF THE CATARACT OPERATION.—SAVAGE, G. C., Nashville (*Journal of the Tennessee State Medical Association*, June, 1909). After criticising the operation of expression of cataract as practised and directed by Smith, Greene, Würdemann and others Savage devised an instrument by which he thought he saw a way out of the difficulties and the dangers. The universal comment was: "It ought to do the work." June 14 he tried the instrument, in his office, on one human eye recently enucleated, and on a dozen sheep's and pigs' eyes. In every instance the instrument dislodged the lens in its capsule, by tearing loose the ligamentous attachments, and delivered it as it was being withdrawn from the eye. In five of the animal eyes the point of the knife used for making the corneal incision had cut the anterior capsule (the lens being transparent, it could not be seen), but, notwithstanding, these lenses were dislodged and delivered in their capsules. The instrument at each end terminates in a double curve, the one in line with the handle and other at right angles to this line. The point of bending is the point of union of the two curves. The two curves are to have the same radius as has the anterior surface of the lens, and the curves are to be 5, 6 and 7 mm. long, for the reason that

eyes vary in size. The name will be the "Cataract-in-Capsule Extractor."

The new means described above makes necessary a new method of operating—new in essential particulars. The following is the method to be pursued: (a) Thorough preparation of patient, instruments, operator and assistant; (b) complete local anesthesia; (c) lids separated by a stop speculum, or the upper lid held up by the assistant, with a lid elevator, while the lower lid is pulled down by the other hand of the assistant; (d) the operator fixes the eyeball by grasping the tendon of the internus, then with the other hand he makes the corneal incision, associating with it a good conjunctival flap; (e) if an iridectomy is to be done, the one hand continues to fix the globe, while with his other hand the operator seizes the iris with iris forceps and gently draws it out through the incision just far enough to enable an assistant to make a vertical snip of the iris with iris scissors close to the tip of the forceps; (f) the iridectomy having been done—or if the iridectomy is not to be done—the operator, still continuing to fix the eye with his grasp of the tendon, takes in his other hand the cataract-in-capsule extractor and passing it into the anterior chamber, he directs the free point of the horizontal curve between the iris and anterior capsule, pressing it gently downward until both the horizontal and vertical curves are behind the iris, or between the iris and the cataract, and now the extractor is to be so held that the horizontal curve shall rest on the lens below, but parallel with the horizontal meridian of the lens, while the vertical curve shall rest on the lens to the outer side of, but parallel with, the vertical meridian of the lens. This is the primary position of the Extractor. On three movements of the Extractor depends the success of the operation: (1) The vertical curve is made to press against the lens in such a way as to rotate it on its vertical axis, causing the outer margin of the cataract to move backward while the inner margin is made to advance to the same extent. The effect of this movement of the Extractor is to tear loose the ligaments laterally, the tear including much more than two quadrants, leaving untorn, probably, only a few fibers directly above and below. Now the instrument must be returned to the primary position, thus replacing the cataract in its normal position. (2) The horizontal curve of the Extractor must now be made to rotate

the cataract on its transverse axis by advancing the free end of the instrument while making gentle pressure against the cataract below its center. The effect is to make the lower margin of the cataract recede while the upper margin advances accordingly. This motion tears loose the few remaining fibers of the ligament, above and below, making easy the next step. (3) The cataract in its capsule having been torn loose by the two movements of the Extractor outlined above, its delivery through the corneal incision is to be effected by continuing the pressure with the horizontal curve as the Extractor is being withdrawn from the eye. The cataract-in-capsule glides out beautifully before this combined force of backward pressure and lifting.

Before relieving his grasp of the tendon of the internus, the operator should replace any protruding iris with the point of union of the two curves of the Extractor; then he should replace the conjunctival flap over the corneal incision with either the vertical or horizontal curve of the Extractor. The operation is finished by removing first the fixation forceps, then the speculum or lid elevator.

H. V. W.

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THE SMITH OPERATION FOR CATARACT.—(GREENE, D. W., Dayton, Ohio (*The Lancet-Clinic*, June 12, 1909). The Pagenstechers record their experience in six hundred cases in which they extracted the lens by passing a scoop behind it in the vitreous and scooping the cataract out. They state that loss of vitreous was never a source of failure, even up to one-third of its volume, and only one case of detachment of the retina occurred in the six hundred extractions in the capsule. Loss of vitreous occurred in 52 per cent. of cases. Later the Pagenstechers seem to have lost faith in the operation. Beer, Richter and Macnamara also made it. Major Smith took it up to avoid secondary operations, and because of greatly insufficient hospital accommodations. He has made 20,000 extractions in the capsule. In his last report of 2,600 cases the loss of vitreous is given as 6 per cent. According to W. F. Ring, of Baltimore, in 3,400 extractions made by operators of note in this country and abroad vitreous loss was 7.23 per cent., so that Major Smith's loss of vitreous was better than that obtained by the best operators in this country and Europe. A great field for this operation is in the extraction of immature

cataracts. In the 125 operations made by the writer he does not recall ever having lost *normal* vitreous. M. D. S.

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NOTES ON THE PREPARATION, ASSISTANCE, AFTER-TREATMENT AND MANAGEMENT OF CATARACT CASES FOR ASSISTANT SURGEONS AND HOSPITAL ASSISTANTS.—AHMED, BAKSHI, Nowgong, C. P., India (*Indian Medical Gazette*, May, 1909), deals with points of interest and importance to those who assist in getting cases ready for extraction and who look after them afterwards, for those in India that is who correspond to house surgeons in Occidental countries and in Indian presidency towns. After some general research on the selection of suitable cases and the general preparation of the patient—in which he says females mostly have the hairs of the head cut short, males having them shaved (“in the case of high-caste and clean females this is left to their option”)—the preparation of the eye is dealt with. The eyelashes are cut, 1 in 5,000 sublimate or 1 in 2,000 chinisol is used in the sac, the lid edges are cleaned also, then rubbed with absolute alcohol. Two p. c. cocaine solution is used and atropine instilled. Instruments are boiled, cutting ones only being cleaned with alcohol. Atropine is used again after operation and both eyes bandaged after applying sterilized boro-vaseline. Dressed after 48 hours.

F. P. M.

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CATARACT OPERATIONS IN DIABETES. UITHOFF, W., Breslau (Silesian Society for Patriotic Culture, Breslau, December 4, 1908. *Deutsche Med. Woch.*, 1909, No. 17, p. 778), reports on 120 cases operated upon, with the following remarks: Five per cent. of all cataract operations are performed on diabetics. 0.12 per cent. of all eye diseases are diabetic cataracts. The following complications of the operations were observed: Six per cent. severe iritis, 5 per cent. slight iritis, 1.8 per cent. glaucoma, 1.8 per cent. slight increase of tension. Gangrene of a leg or other complications of diabetes do not, in general, contraindicate the operation. A special antidiabetic diet before operation is not to be recommended. V was good (up to 1 iii.) in 68 per cent., moderate (to 1/x.) in 18 per cent., poor (under 1/x.) in 14 per cent. U. performs simple extraction and instills eserine. After the operation there is greater danger of infection and hemorrhages than usually. U. observed 9 per

cent. hemorrhages into the anterior chamber, 4.5 per cent. into the retina. Timely massage is of service in tardy closure of the anterior chamber. For narcosis ether is always to be recommended.

C. Z.

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SCLERAL COLLAPSE DURING CATARACT OPERATION. — FERNANDEZ, JUAN, SANTOS, Havana, Cuba (*Arch. Ophthalm.*, May, 1909, xxxviii., 276), concludes, from his observations in 26 cases of scleral collapse during cataract extraction, that strong solutions of cocaine are responsible for the above condition. The amount of cocaine used was subsequently reduced to three drops of a three per cent. solution, one drop being instilled in the eye every ten minutes. With this method of instillation no case of scleral collapse occurred.

The author gives the clinical reports of the 26 cases.

W. R. M.

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THE CURABILITY OF CATARACT WITHOUT INTERFERENCE. A CLINICAL STUDY. — LE ROY, BERNARD, R., Athens, Ohio (*Amer. Jour. Ophthalm.*, May, 1909). The writer has been prompted to publish the results of his investigations in this direction in order to encourage further research on these lines. He found that "ammonia was the active primary cause or exciting factor in perhaps all diseased conditions" and that "if we should be able to control the output of ammonia within our bodies and thus prevent this substance from accumulating in the secretions beyond what is deemed the normal quantity, we could thereby prevent many of the diseased conditions from supervening and thus escape many of the dangers of ill-health and of premature death."

The writer studied the solvent power of the thiocyanates and found that solutions of 1:40,000 to 1:100,000 of the thiocyanates of potassium would dissolve about four per cent. of the carbonate of calcium and magnesium. He observed that when the system is deprived of its usual supply of the earthy salts, it endeavors to make up the deficiency through the action of certain phagocytic cells which rob the more solid parts of the system, thus producing many diseased conditions.

With these facts in mind, the writer entered upon the study of those diseased conditions wherein the salts of calcium, magnesium and silicon are most concerned, namely, arteriosclerosis, chronic syphilis and certain general conditions found in

cases of senility. Employing the administration of thiocyanates in a number of these cases and noticing the gradual fading away of the arcus senilis in many of these cases, he determined to try this form of treatment in cases of simple cataract. Sodium thiocyanate was given in one grain doses, well diluted with water, after each meal; later the remedy was used hyperdermically, combined with small doses of pilocarpine. The thiocyanates must be caused to appear in the saliva, somewhat in excess of the normal content, before salutary results are obtained, yet the amount must be well guarded, for a quantity that is too far in excess of the normal content will cause untoward symptoms and perhaps death, for the thiocyanates are very active poisons when administered carelessly.

The first case reported had chalky cataracts 36 years, the last ten being spent in total blindness. After ten weeks of treatment the lenses had lost the chalky whiteness, were even bluish, fading toward a normal color. The patient could then see "tree-tops."

The second case improved from total blindness which had lasted two years to "distinguishing between a book and a hat at five feet."

Case 3 had cataracts in both eyes; one-quarter of a grain of the remedy was given after each meal; after ten weeks practically no evidences of cataract.

In conclusion, he asks his readers, before rushing into print with attacks upon him, to try this treatment in cataractous cases, being careful not to overdo; to examine the saliva daily; to use the sphygmomanometer and study the arterial pressure since this must be kept as nearly normal as possible; not to rush cases since there is danger in this, not to give large doses of sodium thiocyanate.

C. H. M.

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ILLUSTRATIONS OF ZONULAR CATARACT.—LEZENIUS, A. St. Petersburg (*Archiv für Augenheilkunde*, 63, 1909, p. 163). The 12 colored illustrations show the complicated configurations, of which the generally described uniformly grey disc of opacity of the lens consists, when examined with the corneal microscope of Zeiss: More saturated places, opacities in form of a clover leaf, sectors, radial stripes, broad bands. In some cases fine brown threads extend from the anterior capsule to the iris, which are drawn out with the dilatation of the pu-

pil by atropine. They must be regarded as remnants of the pupillary membrane, and are of interest, as they are considered by some authors as proof for the development of zonular cataract in the last few months of intrauterine life, in cases in which pupillary membrane and zonular cataract coincide.

C. Z.

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ON ANNULAR OPACITY OF THE ANTERIOR SURFACE OF THE LENS AFTER CONTUSION OF THE EYEBALL.—(VOSSIUS). HÖEG. NIELS (*From the eyeclinic of Prof. Bjerrum in the University of Copenhagen. Klin. Monat. für Augenheilkunde*, xlvii., June, 1909, p. 593), adds to the 12 cases, tabulated from literature, another one in a man, aged 19, who was struck by a football at the region of the left eye. After 5 days: annular dotted opacity at the anterior surface of the lens, of 3 mm. diameter, slight opacity in the area of the ring, not visible on oblique illumination. It was complicated by sugillations of the eyelids, mydriasis, hyphema, opacities of vitreous, whitish opacities, later extensive atrophy and pigmentations, in the upper half of the fundus. After 13 days it decreased in intensity and gradually subsided. The opacity at the anterior surface of the lens equaled exactly the former cases with this apparently typical clinical picture. It has been observed at the earliest a few hours after the injury remained unaltered for from 6 to 18 days and disappeared in from 8 to 60 days, and has no essential influence on the sight. H. adopts the explanation of Vossius that the affection is due to an impression of the pupillary margin on the anterior capsule of the lens. Vossius attributes the brownish opacities to pigment, squeezed from the pigment cells of the posterior layer of the iris by the pressure of the inverted cornea against the iris and lens, and fixated by fibrin. The grey opacities are ascribed to degenerative changes of the capsular epithelia and the uppermost fibers of the lens, in accordance with the experimental findings of O. Schirmer in rabbits, after pressing the button of a probe, introduced into the anterior chamber, against the anterior capsule. H., however, maintains, from the completeness, regular form and size of the ring of opacity, and shape of injuring bodies, that the mechanism of the injury is due not, as Vossius thinks, to the inversion of the cornea, and subsequent incarceration of iris between cornea and lens, but to the pressure



of the iris against the anterior surface of the lens caused by the sudden increase of pressure of the aqueous. C. Z.

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TO THE KNOWLEDGE OF ANNULAR OPACITIES OF THE LENS FROM CONTUSION.—CASPAR, L. Mühlheim (*Klin. Monat. für Augenheilkunde*, xlvii., June, 1909, p. 606). The eye of a woman, aged 29, was struck by a nail, causing a perforating wound of the cornea from its lowest point to the temporal end of the horizontal meridian, with a large prolapse of iris, and hyphema. After the blood was absorbed, a few days later, C. saw, by oblique illumination, the characteristic faintly dotted opacity of the anterior surface of the lens, of the size of the normal pupil, but not in form of a circle, but oval, corresponding to the defect of the iris. The case clearly showed the origin of the opacity of contusion from the impression of the pupillary margin on the lens, at the moment, in which the pupil, after the prolapse of the iris, had assumed the oval shape. C. Z.

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ON ROEMER'S SPECIFIC THERAPY OF INCIPIENT SENILE CATARACT.—SCHIRMER, O., Strassburg (*Deutsche Med. Woch.*, 1909, No. 27, p. 1180). In his paper before the Ophthalmological Congress at Heidelberg in August, 1908, Roemer asserted, that by giving patients with subcapsular senile cataract lentocalin, prepared from albumin of the lens, he observed not only V to remain stationary, but also more or less considerable improvement. An impairment of vision was never seen during the period of observation up to 12 months. S., with Drs. Wissmann and Bornstein, investigated experimentally what became of albumin of the lens in the body and in artificial digestion, although lentocalin, which is not generally obtainable, was not at his disposal.

In rabbits, fed with large quantities of lenses of cattle, undigested, besides the digested, albumin of the lens passed into the body and produced, after several weeks, reactive phenomena, specific for albumin of the lens, *i. e.*, specific anti-substances.

In the (carnivora) cats, a transit of undigested albumen of the lens into the organism was never ascertained.

Thus the theory of the favorable action of feeding lenses,

which might be inferred from Roemer's hypothesis on the origin of senile cataract, is by S.'s experiments in carnivorous animals not only not supported, but, on the contrary, they speak directly against such an explanation.

Koenigshoefer made in the years from 1897 to 1901 attempts to cure senile cataract by feeding lenses, but gave them up, as he saw no results.

The assertion of R. of the harmlessness of his method found a contradiction in the observation of S. that quite a number of rabbits died immediately after being fed with lenses, under convulsions from shock, *i. e.*, showed a state of anaphylaxis.

C. Z.

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NOTE ON TWO ELECTRIC CATARACTS. ROCHE. (*Annales d'Oculistique*, May, 1909.)

The patient received a charge of 5,000 volts on the left side of the body. He was unconscious for half an hour. The cheek and arm were badly burned and the left half of the inferior maxilla was laid bare.

A month later he noticed an impairment of vision of the left eye, which increased rapidly until in three weeks the eye was blind. A week after the blindness of this eye the right was affected in the same way.

The lenses were white and much swollen, the anterior chambers being practically obliterated.

After extraction in the right eye, the lens was found to be nearly clear, but the capsule was white and dense.

Hess, in his laboratory experiments, found the anatomical lesion to be a destruction of the crystalline epithelium, and the author thinks that the same lesion existed in the case of his patient. The primary lesion was in the capsule and the lens was affected only secondarily. This corresponds with the fact that electricity is known to have an elective action upon epithelial elements.

G. C. H.

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INVESTIGATION OF GLASS WORKERS' CATARACT. PARSONS, HERBERT (*The Dioptric Review*, Apr., June, 1909). The following letter has been sent to various manufacturers and ophthalmic editors:

Dear Sir:—The Royal Society has appointed a committee,

of which I am a member, to investigate glass workers' cataract. We are desirous of obtaining information as to the incidence of the disease in Canada and the United States of America. More particularly we wish to ascertain the relative frequency of the typical form of cataract—a small disc-like opacity in the posterior cortex of the lens—in the various branches of glass manufacture. The condition is common among bottle makers (not makers of flint glass bottles) in England, but we are doubtful as to its prevalence among pressed glass workers. We understand that in America an extremely hot oil furnace is used by the "melters" in this form of glass manufacture. We should be greatly indebted to you, therefore, if you could give us any information on the subject, more especially—

(1) As to the incidence of the specific form of cataract among (a) bottle makers; (b) pressed glass makers; (c) plate glass makers.

(2) As to the use of recent inventions in the manufacture of these types of glass and their nature—particularly as to the fuel and temperature of the furnaces employed. H. V. W.

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### CASUISTICS.

TO THE CASUISTICS OF THROMBOSIS OF THE CAVERNOUS SINUS. GINZBURG, J., Kiew (*Centralblatt für prakt. Augenheilkunde*, June, 1909, p. 161), reports 3 cases. In the first, a woman, aged 19, the thrombosis was due to an aseptic compression of the cavernous sinus by a large osteosarcoma of the ethmoidal bone, extending to the sella turcica, leaving both orbits free. There was swelling of lids, exophthalmus in both, chemosis, the ocular movements very much reduced, pupils, medium sized, reacted promptly, bilateral papillitis. During a month's observation the patient complained of severe headache. Other brain symptoms were lacking, except slight drowsiness a few days before death.

Case 2: A hordeolum of the right upper lid of a girl, aged 9½, of scrofulous habitus with eczema of the face, had been opened by relatives, followed by phlegmon of the lid. By a large incision necrotic tissue was removed. On the third day the chemosis became more intense, on the fourth day exophthalmus of right, on the fifth day, of left eye, developed with chills and high temperature, swelling of glabella and mastoid region. On the 6th day the patient was unconscious. Oph-

thalamoscopically the fundus of both eyes was normal. Under various changes of the condition the patient died on the 46th day. Undoubtedly the process started from infection of the hordeolum. On account of the existing disturbance of circulation of the upper lid, the incision could not prevent the progress of the thrombosis of the blood vessels backwards. This was accompanied first by stasis in the conjunctiva, then in the orbital tissue, and as soon as the cavernous sinus was reached the whole complex of symptoms developed on the other eye within a few hours. The case showed that apparent improvements must not arouse illusions as to a good prognosis.

Case 3. A woman, aged 34, noticed for 2 days a protrusion of the left eye and complained of pain in the orbit and left side of head. The upper lid was swollen, there was chemosis, pupil reacted normally, media clear. Pressure on the eyeball from in front backward was painful. In the night from the 5th to the 6th day the patient had a chill, a temperature of  $41^{\circ}\text{C.}$ , and after vomiting several times became comatose. Now also the right eye was protruded with chemosis and swelling of upper lid, so that the diagnosis of thrombosis of the cavernous sinus was clear. The patient died on the 5th day.

The postmortem revealed basilar purulent meningitis, a yellow purulent thrombus in left cavernous sinus, a red hemorrhagic thrombus in the left cavernous sinus, the left ophthalmic vein enlarged and thrombosed, the right only ectatic. The walls of the veins were thickened and infiltrated, on some places they were surrounded by accumulations of leucocytes. The thrombi contained streptococci. Corresponding to the ophthalmoscopic condition the eyeball was normal. The affection was due to a septic thrombophlebitis caused by the invasion of the orbital veins by streptococci. Through spreading of the thrombosis backwards a septic obstruction of the cavernous sinus was established with secondary purulent meningitis and symptoms of stasis in the other eye.

C. Z.

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### CIRCULATION.

FURTHER CONTRIBUTION TO THE ETIOLOGY OF RELAPSING JUVENILE HEMORRHAGES OF RETINA AND VITREOUS.—NOLL, H., Würzburg (*Archiv für Augenheilkunde*, 63, 1909, p. 213). The etiology of relapsing intraocular hemorrhages in persons of from 15 to 25 years is still obscure. They are generally

attributed to 3 causes: 1, anomalies of blood mixture, *e. g.*, in pernicious anemia, leukemia, oxaluria; 2, disturbances of circulation, frequent at the age of puberty; 3, local vascular diseases, perivascularitis, from general affections, as pernicious anemia, lues, tuberculosis, leukemia, malaria, sepsis, intoxications, amyloid, glycogenous, hyaline or sclerotic degenerations.

N. adds, as a fourth group, hemophilia and reports a case. A soldier, aged 22, gave a history of hemophilia with which also 2 brothers were affected. For years, he frequently noticed sudden impairment of sight, which always subsided after a few weeks. At the last attack, 2 weeks ago, he could not see the sights of his rifle. On account of hemorrhages into the vitreous and floating old opacities there was a slight red ophthalmoscopic reflex of right eye, but fibrinous threads at the posterior surface of the lens, black pigmented connective tissue at the lower temporal quadrant of the lens, and in the lower nasal quadrant a large white nodule, from an old organized hemorrhage could be seen. V. fingers at 1 m. In the vitreous of left eye were also floating opacities, but the fundus was clearly visible, showing at the periphery numerous recent and older ecchymoses near the tortuous veins. The older foci were scattered as white or grey patches of various forms. V. 6/vi. Emmetropia.

The treatment consisted in rest, light diet and physics, and, after three weeks, in injections of mercurial ointment. V. R. rose to 6/xx, disc and macula appeared normal, but no accurate picture of the vessels could be obtained. The hemorrhages in left eye were gradually absorbed, leaving grey, partly pigmented, foci. In concordance with the observations of others, the hemorrhages originated in the veins, which, however, revealed no ophthalmoscopic changes (in form of perivascularitis).

C. Z.

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TRAUMATIC EXOPHTHALMUS WITH A SOUFFLE THAT DISAPPEARED ON COMPRESSION OF THE ANGULAR VEIN. —BETTREMIEX (*Annales d'Oculistique*, January, 1909).

Bettremieux reports the case of a man who had received a blow over the right eye. He was unconscious for several hours, and some weeks later noticed exophthalmus and congestion of the eyeball. There were slight exophthalmus, dilatation of

the conjunctival veins and edema of the caruncle and of the lids. The optic disc was congested and the retinal veins dilated. The patient complaining of a sound, particularly at night, which he compared to that of a jet of steam, and auscultation revealed a souffle, heard all over the head but with a maximum at the right temple, which corresponded with the systole of the heart.

Pressure at the upper inner angle of the orbit in the reign of the angular vein caused a complete cessation of the souffle which returned immediately when the pressure was removed.

The author has found two other cases in literature in which pressure on this vein arrested the souffle—one by Wecker and one by Jocqs. Wecker thought that pressure on the vein stopped the vibration in it communicated from neighboring arteries, and Jocqs, that the souffle, caused by compression of the ophthalmic artery by the dilated vein, ceased when the vein was partially emptied. The latter explanation has been accepted by several authors, but, according to the researches of Merkel and Festal, the vessels which connect the veins of the orbit with those of the face are provided with valves which prevent fluids injected into the facial veins from entering the ophthalmic.

The author explains the effect of pressure on the angular vein simply by reduction of the orbital circulation. G. C. H.

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### CORNEA.

THE TREATMENT OF DISEASES OF THE CORNEA. WILHELMANN (*Wiener Klinische Rundschau*, March 7, 1909). The main therapeutic measures in diseases of the cornea are compressive bandaging, bloodletting and mydriatics. The bandaging puts the affected organ at rest and excludes the light. In acute inflammations it might also become necessary to close up the healthy eye. In very painful and acutely inflamed cases the bloodletting acts often very favorably, and at times it is possible to avoid the complicating iritis. Four leeches applied to the temple seems to be an efficacious method of bloodletting in these cases. This procedure, however, is contraindicated in anæmic and weak patients and in inflammations of the cornea, which have already progressed too far. The instillation of atropin acts as an antiphlogistic. In children ointment containing atropine may be employed. J. G.

CAUTERIZATION OF THE CORNEA BY ACIDS AND ITS TREATMENT.--(GUILLERY, H., Coehn (*Archiv für Augenheil.*, 63, 1909, p. 258). Although the cauterization by acids ranks in practical importance next to that by lime, we know very little about their action. G., therefore, investigated by experiments on rabbits, clinically, anatomically and chemically, the action of sulfuric, hydrochloric, nitric, and acetic, acids on the cornea, and reports his results in detail. Like lime, acids produce an instantaneous opacity of the cornea but not as intense, so that the pupil can still be seen. After from a few minutes to half an hour the opaque area clears up, leaving a narrow whitish ring at the periphery. This can be repeatedly observed after renewed cauterizations. The next day, however, the opacity increases and may become impermeable for light with subsequent ulcers, perforation and necrosis of larger areas. The cornea remains anesthetic and, if necrosis sets in, never regains its sensibility.

G. found that chemically the opacity of the cornea is due to coagulation of albumin and mucoid by nitric and hydrochloric acids, of mucoid, and if very concentrated also of albumin, by sulfuric acid, of mucoid by acetic acid, but only in low concentration.

The histological changes of the cornea are comparatively slight: defects of the epithelium, lack of normal corpuscles of the cornea, infiltration with round cells, exudation, more or less purulent, into the anterior chamber, enlargement of the blood vessels of the iris, in several cases the ciliary body was covered with pus. Microphotographs illustrate the finer changes.

G. found in a  $\frac{1}{2}$  per cent. solution of hydrate of potash a harmless but very effectual remedy for clearing up recent opacities caused by acids, which does not leave a peripheral ring as the spontaneous clearing mentioned before. He therefore recommends for chemical factories in which cauterizations by acids are liable to occur, to have in readiness cocaine and a  $\frac{1}{2}$  per cent. solution of hydrate of potash. This is best applied in form of an eye bath immediately after the injury, or by abundant instillations while the lower lid is lifted up in the shape of a pocket.

Another important action of inorganic acids on the eye, so far scarcely known, is that on the lens. It consists in much



more intense anatomical changes than on the cornea, although the lens is reached by the poison after considerable dilution. They represent an experimental form of cataract, which is minutely described, similar to other well known types: alterations of the capsular epithelium like in senile cataract, opacities and formation of vacuoles at the equator. A spontaneous clearing up of such lenses cannot be expected. The affection of the lens is, therefore, of great importance in estimating visual disturbances after cauterizations with acids and with regard to therapeutic measures. A careful study of G.'s thorough and accurate essay is urgently recommended. C. Z.

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REPORT OF A CASE OF KERATITIS PROBABLY DUE TO METASTATIC GONORRHEA. -POSEY, WM. CAMPBELL, Philadelphia (*Ophthalmic Record*, May, 1909). A man of 28 years first suffered from some unknown corneal disturbance twelve years before, which was preceded by an attack of urethritis. During the succeeding twelve years he has had a chronic urethral discharge, but no rheumatism. He has also had occasional ocular disturbances, but they were apparently not associated with increase of the urethral discharge. The present attack is more in the nature of a vascular keratitis, the entire membrane being superficially hazy, the central portion more or less opaque, and the seat of some six or eight small vesicles. A culture was made from the cornea and gonococci were also found in the urethra. He was suffering at this time with a fresh outbreak of gonorrhea. Mulford's antigonococci serum was administered in  $\frac{1}{2}$  to 1 cc. doses. The patient was in the hospital for about two months and was discharged with the eye and urethra healed.

M. B.

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### GENERAL DISEASES AND EYE.

UNILATERAL AMAUROSIS DURING PREGNANCY. -REUTER, II., (*From the eyeclinic of Prof. C. Hess in the University of Würzburg. Archiv für Augenheilkunde*, 63, 1909, p. 1804. Visual disturbances during pregnancy rarely are merely functional, as in the predominating majority objective changes were found. The so-called functional disturbances of sight in pregnancy almost always due to hysteric or uremic amaurosis. There are only a few cases in which this could be excluded, viz. of icterus, where the transient amaurosis was ascribed to autointoxication by toxic products of metabolism.

R. observed a case of right amaurosis in a woman, aged 29, in the 2nd month of gravidity. The same had occurred in the preceding pregnancy, 2 years ago, but it disappeared after about 4 days. V. had been impaired for 5 days, without pathological ophthalmologic conditions, except a pigment seam on temporal and nasal borders of disc. The pupil, medium sized, reacted, not directly to light, but consensually and on convergence. Simulation tests proved that the patient made correct statements. The left eye was perfectly normal. Under milk diet, syrup of iodid of iron and iodid of potash, V. gradually rose, within 2 months, to 6/xv., but the right disc appeared paler than the left. Most probably the visual disturbances were caused by the pregnancy, whether from toxic influences or disorders of nutrition or circulation could not be decided.

C. Z.

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ON SPECIFIC RELATIONS BETWEEN RETINA AND KIDNEYS,  
WITH REMARKS ON THE GENESIS OF ALBUMINURIC RETINITIS.

ZUR NEDDEN, DR., Bonn and Essen. (*Archiv für Augenheilkunde*, 1909, 63, p. 217). It is a well known fact that an organism after the introduction of certain cell groups of another species of animals, produces substances which for this kind of introduced cells are toxic and are called cyto-toxins. zur Nedden discusses Sata's important investigations on the influence of organ toxins upon the different tissues of the organism, as they furnished the foundation for his own experiments. Sata found that serum of a rabbit, into the peritoneum of which an emulsion of kidneys of guinea-pigs had been injected, evoked in guinea-pigs a parenchymatous nephritis, more or less severe according to the toxicity of the nephrotoxin. But not only the kidneys, but also the liver, brain and the erythrocytes were damaged by the nephrotoxin. This led to the assumption, that these organs contain groups of albumin which is identical with that of the kidneys. Since the antitoxin is made from all tissues of the kidney, all tissue elements of the kidney are influenced, while in the other organs only such elements are altered which are biologically identical with those of the kidney.

zur Nedden studied by experiments the effect of nephrotoxin on the eye. Extirpation of both kidneys of rabbits,

which lived for a few days after the operation, had no pathological influence on the eyes, nor the injection of nephrotoxin prepared in a dog after injection of crushed kidneys of rabbits. Then zur Nedden examined the influence of nephrotoxin on retinae of rabbits, crushed in a mortar, without positive results. Injections of nephrotoxin into the vitreous caused severe inflammations which, however, did not differ from those after injections of normal serum of another species.

He then tried as a third method injections of nephrotoxin into the common carotid. The result was striking. After 2 hours he found marked changes of the retina of the homolateral eye. They commenced in form of slight greyish white opacities, and reached their maximum after 6 hours, appearing as circumscribed bluish gray foci, slightly prominent, and irregularly scattered over the background. The disc and vessels were normal. No pathological changes occurred in the other eye. The same experiments with normal serum of another dog were negative. The animals generally died soon from the invariable affection of the kidneys.

One animal survived longer. On the 3d day the borders of the disc were swollen, the retinal veins hyperemic and tortuous, the arteries not changed. After from 10 to 14 days the bluish prominent foci were converted into white glaring patches of degeneration, similar to those of albuminuric retinitis, others became pigmented. In some cases there were also hyperemia of iris or iritis. The histological examination showed that the changes were confined to the inner layers of the retina.

Thus the experiments demonstrated a specific action of nephrotoxin on the retina and led the author to the conclusion, that there are identical groups of albumin in the kidneys and inner layers of the retina. He utilizes his findings for the explanation of the genesis of albuminuric retinitis and thinks that among the many etiological factors the auto-cyto-toxins play perhaps the most important part. C. Z.

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AN ANALYTIC CRITICISM ON THE CARDINAL LID SYMPTOMS IN ENOPHTHALMIC GOTTRIE (BASELOW'S DISEASE). - SIKER, GEORGE F., Chicago, Ill. (*Ophthalmic Record*, July, 1909). From an analysis of the various signs we can with propriety discard all the various theories advanced for the causation of these signs excepting the increased muscle tonus which

is brought about by the direct activity of the thyroid toxin—either by way of the nerve fibers or directly upon the muscles themselves. No doubt the individual anatomic construction of the conjunctival fascia, as well as the individual size of the globe, are but incidental contributing factors. Also, that the so-called Müller's muscle is not the important factor, while the cylinder of plain muscle fibres springing from the septum orbitale (Landstrom) is all important. It can also be seen that all of the lid signs are exceedingly closely related as to the direct cause, but symptomatically independent of one another. That there is a causal relation between the Stellway and von Graefe sign must be conceded. One sign is just as valuable as the other in all its aspects and the characteristics of all are very similar. The exophthalmos sustains a slight relation to all—a contributing factor. The vaso dilatation which necessarily results from the sympathetic interference is but a secondary consideration in each sign. The anatomic variance in the conjunctival fascia is at no time a direct etiologic factor. Each one of the signs can be intrinsically modified by the absence or presence of an anatomical lesion.

Finally all of the lid signs are dependent upon a stimulation of the sympathetic nerve fibers and the palpebral muscles supplied by them; in addition there is a direct increased muscle tonus. This view is further substantiated by the fact that a paralysis of the sympathetic produces almost the exact opposite train of lid symptoms. Above all, it is more than passing strange that the iris seldom is involved, though the sympathetic fibers are so profoundly implicated. M. B.

### GLAUCOMA.

OPTIC ATROPHY IN SYRINGOMYELIA: CONGENITAL CAUSE FACT WITH UNUSUAL ATROPHY OF THE IRIS FROM SECONDARY GLAUCOMA.—SHUMWAY, E. A., Philadelphia (*Ann. Ophthal.*, July, 1909). The special feature of interest in this case is the atrophy of the optic nerve, since only a very few cases of syringo-myelia have been reported in which atrophy of the optic nerve was present. M. B.

ANATOMIC CONDITIONS IN THE ORIGIN OF GLAUCOMA. HENDERSON, THOMSON (*Wiener Medizinische Wochenschrift*, Jan. 30, 1909). The iris is the only course by which the intra-

ocular liquid can get an outflow. The veins of the iris begin in the canal of Schlemm. By enlargement of the pupil the crypts of the iris become closed, and this leads to glaucoma. The outflow of the liquid is also retarded by the arterial or venous pressure; by this the root of the iris is pressed against the posterior wall of the cornea. Iridectomy opens the tissues of the iris; myotics open the contracted crypts of the iris and make the outflow of the liquid easier. J. G.

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ON THE TREATMENT AND PROGNOSIS OF PRIMARY GLAUCOMA.—MAHER, ODILLO, Sydney, Australia (*Ophthalm. Rev.*, July, 1909). The writer calls attention to the fact that in many operations for chronic glaucoma one not only fails to re-open the angle, but the wound in the sclerotic heals so firmly that no filtration can take place through the resulting scar. "These are for the most part the cases in which iridectomy fails. The operation causes hyperaemia of the ciliary body, resulting in increased and more albuminous secretion, and as the filtration angle is closed and the edges of the scleral wound firmly united, increased tension results. Then it becomes necessary to perform a second operation, either another iridectomy or a sclerotomy, as the eye soon goes blind unless the tension is permanently relieved. If any advantage is to be derived from iridectomy in chronic glaucoma which has existed for a considerable time, since it is practically impossible to re-open the filtration angle our aim should, in my opinion, be to establish a filtering cicatrix."

For the past thirteen years the writer has aimed to establish such a cicatrix in cases of chronic glaucoma of long standing, operating as follows: Having made the usual scleral section with a broad keratome, he drags on the iris with one or two iris forceps detaching its base; the loop of iris thus formed is left well prolapsed for a week, when it is snipped off with iris scissors level with the sclera at each angle of the wound; by this means he generally obtains small flat cystoid cicatrices; little irritation is caused by leaving the iris prolapsed for a week, and the bandage can be dispensed with ten days after the operation.

The cases which he has been able to follow have retained good vision and has not seen any of them go blind. He admits the risk of infection and the possibility of sympathetic ophthal-

mitis as a result of the procedure, but believes these sequelae to be extremely rare and that the advantages are so great that they outweigh the possible disadvantages.

He advocates this operation only in old cases in which there are firm adhesions between of the iris and the adjacent cornea, refers to the cases of chronic glaucoma in which it is not wise to operate, and mentions the statistics of von Graefe, Nettleship, Hirschberg, Schleich, and others, showing widely different results from iridectomy and miotics.

C. H. M.

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PRIMARY GLAUCOMA IN YOUNG PATIENTS.—THOMPSON, A. HUGH, London (*Ophthalmic Review*, June, 1909). The writer states that it is unusual to see patients suffering from primary glaucoma under the age of forty and that no current theory of causation—neither Priestley Smith's nor the recent theory of Thomson Henderson which makes it depend upon a senile sclerosis of the fibers surrounding Schlemm's canal—attempts to explain its occurrence in patients not yet middle aged. For these reasons it has seemed worth while to put on record cases seen in comparatively young people of typical primary glaucoma. The histories of five cases are given.

The following features of the cases are mentioned: 1. In no case was the anterior chamber shallow or the cornea small. 2. The glaucoma generally run a chronic course, with or without subacute exacerbation, but without much pain. 3. In four of the cases cupping of the disc was a well-marked feature. 4. In the first two cases—the only ones followed up for any length of time—the effect of operative treatment in arresting the progress of the disease was, on the whole, good.

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HERPES ZOSTER FRONTALIS ASSOCIATED WITH GLAUCOMA.—BRADBURN, A. A., Southport, Eng. (*Ophthalmic Record*, April, 1909). In this case the tension was increased, but the pupil was not dilated. The upper lid was swollen and the conjunctiva injected. The condition presented a typical picture of iritis, except that there was an absence of the rose-red ring of ciliary injection, the cornea was clear, the iris markings not obscured, and the pupil fairly mobile. She suffered intense pain in and around the orbit, radiating over the forehead, the left side of nose and face. In a short time the development of typical herpetic vesicles over this painful area made the diagnosis clear.

During the course of the disease the tension of the eye became subnormal, the anterior chamber deep, the pupil partly dilated and fixed and the texture of the iris obscured. These symptoms were due to a thin viscid transparent mucoid secretion present in the aqueous. The minus tension was due to defective secretory function of the ciliary body from the paralyzing effect upon the long ciliary nerves. Atropine was contraindicated in the beginning, but was urgently demanded when the late symptoms appeared. The author cites the case because it illustrates the necessity of observing the minutest details in order not to be led astray by a combination of classical symptoms.

M. B.

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### HISTORICAL.

A HISTORICAL REVIEW OF THE DEVELOPMENT OF THE CATARACT OPERATION. STROCKER, LOUIS, Cincinnati (*The Laryngologist-Clinic*, June 12, 1909), reviews the theories of the ancients regarding the structure and functions of the lens. Galen considered a cataract a suffusio; it was held that an eye without a lens could not see. Littre demonstrated an iritic membrane as a true cataract. In 1650 Lasnier showed that an animal without a lens could see, and that a cataract is not a membrane in the pupillary space, but a shrunken crystalline body. In 1705 Brisseau dissected an eye of a soldier after he had, as he thought, removed the membrane, and found that he had depressed an opaque lens into the vitreous. The true nature of cataract was publicly acknowledged in 1708. Daviel made a few extractions of the lens in capsule, returned to reclination, and later incised the capsule with a needle, and delivered the lens through an incision of the lower half of the corneal periphery. Gradually the size of the incision was changed from a lower half-circle to two-thirds of the corneal base, and made above instead of below. In 1846, von Graefe began making improvements, devising his knife for a corneal incision, making the peripheral linear incision of Jacobson and an iridectomy. The writer describes the steps of the Smith operation.

M. D. S.

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### INJURIES.

INJURIES TO THE EYE WITH LIME.—CHATTOPURY, J. R., Dr. (*Allgemeine Wiener Medizinische Zeitung*, Jan. 5, 1909).

The effect of lime upon the eye as a rule is produced by



the chemical action and not by the increased temperature. It is erroneous to avoid water in these cases; on the contrary a thorough cleansing with cold water is advisable. The use of a concentrated solution of sugar which was recommended previously is injurious, inasmuch as the combination, of lime and sugar, which is formed, acts as a caustic. J. G.

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AFFECTION OF THE CORNEA FOLLOWING THE REMOVAL OF THE GASSERIAN GANGLION.—KOLLNER (*Wiener Klinische Rundschau*, Jan. 3, 1909).

In 12 cases of removal of the Gasserian ganglion, the cornea was found affected ten times; in all of them the cornea had lost its sensitiveness. The disease is not to be considered due to a necrosis but to a lesion of the epithelium of the cornea. J. G.

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ON THE ESTIMATION OF THE INJURIOUS EFFECT OF SHORT WAVED LIGHT ON THE EYE.—BIRCH-HIRSCHFELD, A., Leipzig. (*Zeitschrift für Augenheilkunde*, xxi., May, 1909, p. 385), used as light source for his spectographic experiments the electric spark of a copper electrode in hydrogen and that of a zinc electrode in nitrogen, which have the important advantage of greater homogeneity over the usual artificial lights. The refraction of the media of the eye was eliminated by very small slits of the spectograph and by applanation of curvatures through pressure between the quartzplates. In the rabbit, pig, calf, and cattle the rays of a wave length less than 330 mμ. cannot reach the retina, at least those of between 300 and 330 mμ. are absorbed by the lens (with individual fluctuations), those of less than 300 mμ. do not at all penetrate into the eye. There is no proof for the pathogenicity of rays below 400 mμ. on the lens, but B. obtained this by rays above 400 mμ.

The cataract from lightning is not due to glaring, but to a mechanical lesion of the lens, and the glassblower's cataract is not merely caused by ultraviolet rays, but also by other elements. From his investigations in the regulation departments of factories of arc lights, B. never found cataract and contends that the dangers of acquiring cataract by frequent glaring through short waved light is very slight. Cataract has never been observed from mere glaring by lightning or

short circuit. The authors who attribute the senile cataract to the detrimental influence of ultraviolet light go much too far, lacking any proof. The etiological part of ultraviolet rays in inflammations of the anterior segment of the eye, ophthalmiaelectricæ, is undoubted. For the disturbances of the retina (central and pericentral scotomas, impairment of color sense) through glaring by lightning, short circuit, are light, light of mercurial vapors, etc., besides the ultraviolet rays between 400, 350 and 330 mm., the violet and blue rays play a part, as well as in erythropsia. Against his former opinion, B. opposes the one-sided view, that only the ultraviolet rays be detrimental to the eye.

The question as to the protection of the eyes against the evil effect of short waved light cannot be unconditionally answered as long as we are not sufficiently familiar with this. It greatly depends on the kind of light. If this contains an abundance of intense ultraviolet rays, as the arc lamp, mercurial vapor lamp, etc., globes of euphos glass are recommended, the intensity of the blue and violet rays must be subdued by yellowish green or frosted globes, or by indirect illumination. If these precautions are not feasible, persons exposed to these lights must wear protective glasses of euphos glass (which for the absorption of violet and blue rays must be made darker). Enixanthos or Hallauer glass, which also suffice for tours on glaciers and as protection against snow-blindness. Against light which contains less ultraviolet rays (daylight, sunlight on plains), smoked colored are better than blue glasses for sensitive and diseased eyes. C. Z.

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ON THE PRACTICAL EXTENT OF INJURIES OF THE EYE BY LUMINOUS AND ULTRA-VIOLET RAYS. BEST, F., Dresden (*Klin. Monat. fur Augenheilkunde*, xlvii., May, 1909, p. 520), studied this question experimentally. It is not admissible to expose persons to such intense illumination that the interior of the eye becomes affected. But as premonitory symptoms of a disease subjective alterations of the color sense set in, indicating that the limits of the functions of the retina are reached, which by coarse, but still reparable, visual disturbances gradually turn into serious diseases. The object, therefore, is to observe the phenomena on the eye, exposed to the greatest possible illumination that is met with under natural

conditions after exclusion of certain sets of rays by glasses. For this snowfields at higher altitudes are best adapted, as the atmosphere in lower regions absorbs a large portion of luminous and a still larger portion of ultraviolet rays. B.'s plan was to control at his experimental snowfield, the Erzgebirge, the subjective symptoms of glaring, erythropsia, diminution of the red green sense after a yellow, respectively, a blue uviol glass was fastened before one eye, whose pupil had been dilated by homatropin, while the other eye remained free.

The results are summed up as follows: The erythropsia after exposure to snow is the consequence of glaring by luminous rays, as well as the diminution of the red green sensation after glaring and the destruction of the retina by direct sunlight. The sun can be fixated, for 10 seconds, through an uviol glass, 3 mm. thick, without damage to the eye, whereby the whole of the ultraviolet radiation of the sun acts upon the retina, as far as it can reach it. The ultraviolet rays under 400 mμ., under general conditions of life, are perfectly indifferent to the retina, while the luminous rays in excess may damage the retina. The possibility, to produce cataract by momentous concentration of ultraviolet rays, does not prove anything for the chronic injurious effect of ultraviolet rays, assumed by some authors. The percentage of ultraviolet rays in modern sources of light is irrelevant (except in working in direct proximity of electric arc light, in which the deleterious influence of the quantity of light is prevalent). Distressing symptoms in working under bright artificial sources of light are the consequences of faulty arrangements (indirect illumination, avoiding too strong contrasts between light and dark!).

C. Z.

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NATURE AND SYMPTOMATOLOGY OF CERTAIN LATE COMPLICATIONS OF PENETRATING WOUNDS OF THE CORNEA. THE EPITHELIAL INVASION OF THE WALLS OF THE ANTERIOR CHAMBER. MORAX and DUVEGLER (*Annales d'Oculistique*, January, 1909).

These complications may be divided into two classes—those dependent on infection and those that appear to be independent of any infectious process. The paper is concerned with the second class.

Two cases are reported. In the first, a child received a

punctured scissor wound of the cornea near its margin, followed by a hernia of the iris. The prolapse was excised. Healing was prompt, and there were no symptoms of irritation for about a year, when epiphora and intense photophobia appeared. The cornea was clear, and there was only slight episcleral congestion. There was a small adherent leucoma. An iridectomy was followed by a light transient improvement, but three months later the symptoms had reappeared and two iris cysts were found in the anterior chamber. After enucleation the cyst walls were found to consist of dense epithelium like that of the anterior surface of the cornea, including flat, polyhedral and cylindrical cells, resting on a basement membrane.

The anterior corneal epithelium, penetrating through a wound of the cornea, had formed cysts in the anterior chamber.

The second case, which is unusual on account of the cyst appearing externally, was that of a woman, twenty-seven years of age, upon whom an operation for extraction of congenital cataract had been performed. Eight years later a small white cyst appeared at the cicatrix and increased rapidly until it covered the front of the ball.

After abscission of the anterior segment of the eye the cyst was found to fill the anterior chamber, to be continuous through an opening in the cicatrix, with the external tumor and to be lined with corneal epithelium.

G. C. H

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A DANGER ARISING FROM THE USE OF PLATED INSTRUMENTS IN OPHTHALMIC OPERATIONS. ROCKCLIFFE, W. C., Hull, Eng. (*Brit. Med. Jour.*, July 3, 1909). The writer gives a brief history of the case of a patient upon whom he had operated for cataract; the extraction was smooth and uncomplicated; two days later panophthalmitis developed. Before excision a bright foreign body was noticed during an irrigation floating away with the lotion; this was found to be a piece of plating 1.5 mm. by 1 mm. and had come from the de Wecker's scissors used during the iridectomy and had dropped unseen into the anterior chamber.

Investigation showed that the separation of the plate was due to a fault in the copper-nickel plating in the presence of a saline solution, setting up galvanic action; it seemed probable

"that pieces of double metal like this would very much strengthen electrolytic action if they got into the saline fluids of the eye."

The writer warns ophthalmic surgeons to carefully examine instruments prior to use, and suggests an accident like that just described as a possible cause of panophthalmitis after cataract extraction for which no other explanation can be found.

C. H. M.

LIGHTNING BURN OF THE EYE. AYRES, S. C., Cincinnati (*Amer. Journ. Ophthalm.*, April, 1909). The writer reports a case which came under his observation: There was pain in the eye and eyelids; the latter were red, swollen and oedematous. The upper half of the cornea was hazy; there was no iritis and no abnormal tension. Cold applications and cocain were ordered. Two days later there was deep injection of the scleral vessel and adrenalin was prescribed. Three days later leeches were applied and these relieved the pain which cocain and hypnotics failed to do. The swelling of the lids subsided and then cornea cleared up. A month later the vision was practically perfect.

The writer gives brief histories of a few selected cases with varying involvement of the eye and of varying severity.

C. H. M.

INJURY TO CORNEA FROM BROKEN SPECTACLE LENS. HIGGINS, S. G., Milwaukee (*Ophthalmic Record*, July, 1909). The lens was broken by a stone thrown by a boy. One of the broken pieces cut into the cornea and produced a triangular flap. A piece of glass was removed from underneath the flap. A solution of argyrol was dropped into the eye and the eye closed. The next day the corneal wound was stained brown. The flap healed in position leaving no scar, but the former wound remains slightly discolored from argyrosis six months after the injury.

M. B.

CHOROIDAL HEMORRHAGE FOLLOWING OPERATIONS UPON THE GLOBE. POSLEY, WILLIAM CAMPBELL, Philadelphia (*Ann. Ophthalm.*, July, 1909). Two cases are reported, one of extensive hemorrhage into the vitreous during cataract extraction which forced the vitreous out of the eye. After a long process of pain and inflammation, the globe passed into the phthisis

bulbi. The other case was one in which a vitreous hemorrhage occurred during the performance of a sclerotomy to relieve secondary glaucoma in an eye which had been operated upon for cataract six months previously. The eye passed into a low-grade uveitis, with subnormal tension with faint light perception remaining.

M. B.

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A CASE OF AVULSION BULBI.—WILLIAMS, CARL. Philadelphia (*Ann. Ophthalm.*, July, 1909). Scant reference is made to this condition in the literature. Little distinction is made between luxation and avulsion. The former may be non-traumatic, while the latter is always traumatic. The case of a man aged sixty years is reported who was driving home at dusk and while passing a wagon with some gas pipe projecting out from it at an angle, an end of one of the pieces of pipe ran into his eye, lacerating the lids and gouging the eyeball out on the cheek. The only attachment remaining between it and the orbit was the external rectus muscle.

M. B.

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### INSTRUMENTS AND METHODS OF EXAMINATION.

A NEW METHOD OF STERILIZATION.—CONRAD, H., Neubkirchen. (*Deutsche Med. Woch.*, 1909, No. 23, p. 1015.) Boiling in 1 per cent. solution of soda does not absolutely sterilize the instruments. There are ubiquitous bacilli, bacillus vulgaris and mesentericus, whose spores do not perish in boiling water. Absolute sterilization is obtained in Jaffa-Sesam-oil, which in a few minutes can be heated to 200° C., and more, a temperature that surely destroys all known producers of spores. As the boiling point of the oil lies between 310° and 320° C., there is very little waste connected with this method. It is also recommended for the sterilization of bougies and catheters.

C. Z.

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EYE SUTURES OF REINDEER TENDON.—TERSON (*Annales d'Oculistique*, January, 1909) recommends these as stronger, less irritating, and absorbing more slowly than catgut.

G. C. H.

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A MODIFICATION OF BULLER'S SHIELD.—KNAPP, BLAKER J., Evansville, Ind. (*Ophthalmic Record*, April, 1909). The bridge and side of nose, and infraorbital ridge are built out

with superimposed layers of collodion and small pledgets of cotton until a circular ridge is formed upon which the watch crystal rests evenly, and clear of the cilia when the eye is open. The crystal is then fastened on by covering its edges with cotton and collodion. An opening is left at the temporal side for ventilation and cleansing. If the collodion begins to curl at the edges, they may be bound down with a fresh application.

M. B.

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A CHART FOR THE AXIS OF ASTIGMATIC GLASSES.—CLARBORNE, J. H., New York (*Ann. Ophthalm.*, July, 1909). The author believes that the axis of astigmatism does not occur at haphazard; that there is a regularity in its occurrence in a given eye and that there is a certain definite relationship between the axis in both eyes when each happens to be astigmatic. He publishes a chart of the axis to prove his contentions.

M. B.

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### IRIS.

CONGLOBATED TUBERCLE OF THE IRIS, CURED WITH BACILLI EMULSION (KOCH.)—HORNIKER, E., Triest. (*Zeitsch. für Augen.* XX., p. 218) The left eye of a girl, aged 7, of apparently healthy family, who had an inflammation of the left knee joint with a still discharging fistula of the left tibia, became inflamed 4 months previously. At the examination in July, 1906, there was photophobia, lacrimation, moderate ciliary injection, cornea smooth, transparent. The lower half of the anterior chamber was occupied by a gray nodular tumor, with its greatest dimensions at the lower sinus, not reaching the posterior surface of the cornea. Its upper extremity covered the pupil and overlapped the upper pupillary margin by 2 mm. The iris, next to the tumor, was covered by very fine grey nodules, a few of them were also on the upper half of the iris, T. slightly diminished, H. made the diagnosis conglobated tubercle of the ciliary body. Mercurial inunctions, continued for 4 weeks, were of no avail. The tumor now filled  $\frac{3}{4}$  of the anterior chamber and touched the posterior surface of the cornea, which became opaque by numerous dotted deep infiltrations. As the ciliary region assumed a bluish aspect, a sign of threatening perforation, H.



commenced with 1 20000 em. of bacilli emulsion subcutaneously. He observed a parallelism between temperature and local reaction, consisting in greater photophobia, ciliary injection, slight cloudiness of aqueous and more intense vascularization of the tumor, and found this a more sensitive reaction to tuberculin injections than the temperature.

After 43 injections, during 8 months, the tumor disappeared, leaving an atrophic spot on the iris. The deep strata of the lower 3d of the cornea, where the tumor touched Descemet's membrane, was opaque, and a whitish band of connective tissue extended from the lower sinus to the center of the anterior capsule; the lower pupillary margin was adherent to the lens, fundus normal, V 3/lx. 5 further injections, the last one of 2000, at intervals of from 4 to 6 weeks, showed no local reaction nor rise of temperature, so that the case could be considered cured, and remained so up to the last examination, almost 2 years later, with V 5/xxx.

C. Z.

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### LACRIMAL APPARATUS.

CONTRIBUTION TO THE PATHOLOGICAL ANATOMY AND THE PATHOLOGY OF CYSTS OF THE PALPEBRAL LACRIMAL GLAND. WECKER (*Archives d'Ophthalmologie*, April, 1909). Wecker reports a case with the histological examination and concludes that the cause of these cystic tumors, which are rare, should be sought, not in disease of the extraglandular excretory ducts, but rather in the smaller ducts and in the acini themselves.

G. C. H.

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EXTIRPATION OF LACRIMAL SAC INDICATIONS FOR AND TECHNIC OF OPERATION.—MEANS, CHARLES S., Columbus. (*Ohio State Medical Journal*, June 15, 1909.) After describing the anatomy of the lacrimal apparatus, mentioning method of conservative treatment and stating some laws governing this operation, the writer describes his operative technic under local anesthesia, which he finds much more satisfactory because of less hemorrhage. He makes three injections of cocaine and adrenalin, one beneath the skin, over the sac, a second inserting the needle over the upper end of the sac

straight in through the periosteum, and another at the lower end of the sac at the entrance of the lacrimal canal. Using the crista as a landmark, he dissects back the skin, fascia and fibers of the orbicularis muscle till it comes in view, then incises the deep fascia and the periosteum over the crista. He then dissects the sac, beginning at the inner or nasal side gradually removing it in its entire length along with the periosteum. Then he incises the fascia and periosteum on the lateral or external wall and dissects it, beginning from above and gradually dissecting under until it joins where he has dissected from the outside. The sac is then seized with strong forceps and the ligamentous attachments at the upper end cut with scissors; the sac is then turned down and stretched and the lower end incised as low down as possible. The mucous membrane of the nasal duct is removed with a sharp eurette. He emphasizes the necessity of complete removal of the lacrimal sac. The incision is closed by three deep sutures and four or five superficial and the wound tightly bandaged. Some epiphora will probably remain six or eight weeks. In about 8 per cent. of cases epiphora continues. Removal of the inferior lacrimal gland which may be done by doubly rolling the lid and incision of the conjunctiva, will generally relieve this condition. If atrophy of the superior gland does not then result, it may be removed. Sufficient lubrication and moisture of the eye is supplied by other secretory glands.

M. D. S.

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### LENS.

A FAMILY WITH CONGENITAL DISPLACEMENT OF LENSES. - ADAMS, P. H., Oxford. (Report of June Meeting of the Ophth. Soc. of the United Kingdom, *Medical Press*, June 25, 1909.) The series consisted of a mother and seven out of her nine children who suffered from this condition, but no other instance could be found in the family. In three of the cases the lenses were displaced downwards, instead of the more usual displacement upwards, while in the eldest boy the dislocation was complete, thus leaving the pupil clear of the lens. The two members of the family who were unaffected had perfectly normal eyes.

C. H. M.

**MATERIA MEDICA AND THERAPEUTICS.**

ALYPIN WITH SPECIAL REFERENCE TO ITS HITHERTO UN-DESCRIBED CYCLOPLEGIC ACTION. —MAJOR SCOTT-MONCRIEFF, I. M. S. (*Indian Medical Gazette*, July, 1909.) After doing many extractions and other eye operations under alypin anaesthesia, has come to some definite conclusions regarding it. He confirms Maynard's observation (*Indian Medical Gazette*, Feb., 1906), that alypin has less anaesthetic effect upon the conjunctiva than on the iris and cornea shown in second and third instillations being as painful as the first, and in the impossibility of giving subconjunctival injections painlessly with it. In extractions too the end of the section (in conjunctiva) is painful. He has given up using it for extractions, as has Maynard, considering cocain to be better for the cornea, alypin acts quicker than cocain and causes no edema or shedding of epithelium. For removal of foreign bodies it is eminently suitable. On the iris its action is less than that of cocain and he prefers the latter. For interstitial injection (removal of tumors, etc.?), it acts quicker than cocain and is less toxic. The paper in *Ophthalmology* by Frank, of New York (Nov., 1907), on alypin is referred to in which the author obtained perfect results with a 4 per cent. solution in operations for chalazion, trachoma and strabismus—but only one cataract. Darier's favorable opinion of the drug is also quoted. Major Scott-Moncrieff carried out some experiments with alypin on himself and some other people and found that mydriasis and cycloplegia can be induced by instillation of a 4 per cent. solution; by taking one grain internally in water and the hypodermic injection of one grain he found the accommodation markedly paralysed. He says this reaction is possibly peculiar to himself (and it does not agree with previous observations of the drug), but if not we have in alypin a cycloplegic which acts rapidly, acts for a short time only, has little mydriatic effect, and is not dangerously toxic. The matter requires and deserves further investigation.

F. P. M.

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THE USE OF FIBROLYSIN IN EYE PRACTICE. —GROSSMAN, K. (*Wiener Klinische Wochenschrift*, March 11, 1909). Fibro-

lysin is a composition of thiosinamin and sodium salicylate; in contrast to thiosinamin, fibrolysin is easily soluble in water and has no irritating effect on subcutaneous injection. As fibrolysin is easily decomposed, it should be kept in well corked dark bottles. The most important characteristic of fibrolysin is its faculty to soften scar tissue. Fibrolysin is best injected under the skin of the arm. It has been employed in strictures and stenosis of the oesophagus, of the pylorus, the urethra, in chronic arthritis, etc. In affections of the eye the author used fibrolysin in a scar formation on the eyelids, caused by burning with boiling oil. After ten injections both lids could close again. The use of fibrolysin was quite efficacious in a case of retrobulbar optic neuritis. In cases of maculae cornea, the effect was doubtful; in two cases of posterior synechia in rheumatic iritis when atropin could not dilate the pupil. The enlargement of the pupil by atropin was affected after the subcutaneous injection of fibrolysin. The use of fibrolysin was quite efficacious in a case of stenosis of the tear duct. Some caution in the use of fibrolysin is necessary in cases of menstruation and in old people with arteriosclerosis. J. G.

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SYNTHETIC SUPRARENIN. —KRAUPE. (*Wiener Medizinische Wochenschrift*, Jan. 30, 1909.) Synthetic suprarenin is a solution of the salt to which 0.6 mgm. of thymol is added. It does not change, nor does it lose its effect by boiling. Its composition is not changed even if left exposed for days. J. G.

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REMARKS ON THE ACTION OF ADRENIN ON THE PUPIL OF THE FROG. MELTZER, S. J. (From the Rockefeller Institute for Medical Research at New York. (*Deutsche Med. Woch.*, 1909, No. 13, p. 575), claims against Ehrmann his priority in the discovery of the mydriatic action of adrenin on the pupil of the frog, which has been wrongly termed "Ehrmann's method." The adrenin reaction consists not only in mydriasis, but also in immobility, abolished reaction to light, and rounding of the pupil whose longitudinal axis is normally greater than its vertical axis. The mydriasis, however, is not maximal, as

there always remains a seam of iris which cannot be diminished by subsequent instillations or injections.

M. also found that a 5 per cent. solution of Brenzkatechin causes considerable mydriasis of the pupil of the frog which differs in two points from the action of adrenin: in all cases the pupil was never round, but remained oval, and the aqueous was very cloudy, which never occurs after adrenin. A striking difference between both became apparent after using injections for control. An injection of Brenzkatechin into the lymph sac of the frog produced no mydriasis, but very intense miosis.

Finally, M. mentions the observation of W. Cramer, that the extract from the posterior portion of the hypophysis, which, according to Schaefer and Herring, contains the diuretic element, produces mydriasis of the pupil of the frog. C. Z.

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ON THE ACTION OF ADRENALIN ON THE ENUCLEATED EYE OF THE FROG AND THE ISOLATED IRIS OF WARMBLOODED ANIMALS.—WESSELEY, KARL, Würzburg. (*Deutsche Med. Woch.*, 1909, No. 23, p. 1018). With regard to the controversy of Meltzer and Ehrmann as to priority in using the pupil of the frog to the detection of minimal quantities of adrenalin (so-called Ehrmann's method, of 1905), W. calls attention to the fact that he described the action of extracts of the suprarenal capsules on the isolated iris and its applicability to quantitative analysis, as early as 1900, with the following words: "The pupil of the isolated eye of the frog, when brought into a 1 per cent. solution of suprarenin, shows, after a few minutes, maximal dilatation. The isolated iris of the rabbit acts similarly. It can be kept alive for quite a time, in a physiologic salt solution of 37.5 per cent. C, in which the pupil contracts. A momentous, almost maximal, dilatation follows, when such an iris is placed into a suprarenin solution of 37.5 per cent. C. The action on the smooth muscles of the vessels is parallel to the action on the dilator of the pupil and therefore can be measured by this. If the iris is immersed into different solutions of the various preparations, heated to blood temperature, the strength of action can be measured by the occurrence, or lack of, mydriasis." Wesseley's articles were published in Transactions of the 28th Congress of the Ophthalmological Society.

Heidelberg 1900, p. 76, of the 74th Congress of German Naturalists, 1902, p. 392; *Zeil. für Augenheilkunde*, 1905; *Archiv. für Augen.*, 1908, Vol. 60. C. Z.

ADRENALIN, A REACTIVE IN LESIONS OF THE OCULAR SYMPATHETIC. GAUTRELET. (*Archives d'Ophthalmologie*, April, 1909). Gautrelet claims that we have in adrenalin a reactive capable of differentiating between myosis due to sympathetic lesions from that occasioned by other causes, such as tubercular lesions of the lungs, pleura or intra-thoracic ganglia, tabes, sclerosis, etc.

The action of adrenalin is shown by mydriasis of the contracted pupil, which does not occur unless there is a lesion of the sympathetic. Lowe showed that suprarenal extract produced pupillary dilatation after destruction of the superior cervical ganglion, and degeneration of the sympathetic fibres. Elliott applied adrenalin to the ganglions without producing muscular action. Adrenalin acts upon the unstriated muscles.

If instead of injecting adrenalin into the circulation, we instill it in the eye of an animal no decided pupillary action is produced, but Meltzer removed the superior cervical ganglion of a rabbit and twenty-four hours afterwards caused pronounced mydriasis by instilling a few drops of adrenalin solution in the eye. Normally the cervical sympathetic innervates the dilator of the pupil and adrenalin injected into the circulation causes mydriasis by irritating the terminals of the sympathetic nerve. If instillation of adrenalin produces no effect on the pupil unless after the destruction of the superior cervical ganglion it must be because inhibition proceeds from the latter too strong to be overcome by adrenalin absorbed in small quantity.

In normal man instillation of adrenalin in the eye does not produce any effect upon the pupil, but a case is reported in which the sympathetic was severed by a wound in the neck and the pupil on the corresponding side was contracted. Instillation of adrenalin (1 to 1000) caused decided mydriasis which did not yield to bright light. G. C. H.

THE USE OF SCARLET RED IN AFFECTIONS OF THE EYE. WOLTEROM, M., DR., and CORDS, R., DR. (*Wiener Klinische Wochenschrift*, April 15, 1909.) The use of scarlet red in

the healing of granulating surfaces has been extolled by general surgeons, such as Fischer, Schmieder, etc. These authors used the red ointment for diseases of the eye. Good results were seen after the use of the remedy in *ulcus serpens* of the cornea, in a case of long standing corneal fistula, and in *keratitis neuroparalytica*. In some cases a superabundance of new tissue formed which was later easily absorbed. J. G.

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ON THE STAINING OF LIVING HUMAN EYELS FOR DIAGNOSTIC AND PHYSIOLOGICAL PURPOSES. PRELIMINARY COMMUNICATION.—HAMBURGER, C., Berlin. (*Klin. Monat. für Augenheilkunde*, xlvii, Mai., 1909, p. 512), in using the stain uranin, for three-fourths of a year, made the following observations: 1. Uranin is not poisonous. After a sufficient dose of an aqueous solution the skin and mucous membranes assume an icteric color. The secretions of conjunctiva and nose are green, the urin dark red. It has no detrimental influence on the course of intraocular inflammations or operations. 2. Uranin does not enter into healthy eyes at all (or after from two to three hours in minimal quantities), but stains, within from 30 to 40 minutes, the aqueous of inflamed or injured eyes bright green, proportionally to the degree of inflammation. Conjunctival catarrh and slight erosions of the cornea are not sufficient, it must be an intraocular inflammation or irritation, propagated to, or emanating from, the iris or ciliary body. 3. The experiment on living man—uranin given an hour before the operation—demonstrates that the iris predominantly participates in the regeneration of the aqueous, clearly confirming the contention of the author, propounded for many years, in direct opposition to Th. Leber and his school. C. Z.

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EXPERIMENTAL INVESTIGATIONS ON THE ACTION OF SUBCONJUNCTIVAL INJECTIONS OF AIR.—MIJASCHITA, SOSKE, Tokio, (*From the eyeclinic of Prof. Th. Axenfeld in the University of Freiburg*, i. *Br. Klin. Monat. für Augenheilkunde*, xlvii, Mai. 1909, p. 498), tested, experimentally, the value of subconjunctival injections of sterilized air in rabbits by determining the percentage of hemolysin in the aqueous, as devised by Roemer and Wessely, with the following results: The flow of protective substances of the blood serum into the anterior chamber is increased through injections of air as well as of salt



solutions. The increase of hemolysin is noticeable ten minutes after injection, rises in the further course, decreases after six hours until after 24 hours the normal state is reached. Heated air has much more effect than that of the temperature of the room, and is recommended.

The action is thermical, mechanical, and chemical. The injected air lively enters between the mucous membrane and the subconjunctival tissue, displacing the loose connective tissue all over and forms a bullous chemosis. Such intense extension and laceration of tissue must mechanically, perhaps also chemically (although M. rates the special effect of oxygen not highly), influence the endings of the ciliary nerves. The subsidence of the subjective symptoms, photophobia, lacrimation, pain, might be attributed to these direct mechanical elements. Under these circumstances the emigration of leucocytes, microscopically confirmed by Caralt, is easily conceivable, and a part of the reparation certainly is due to their phagocytic activity.

Frenkel considers as a third point the nutritive action of the nervous system, especially of the fifth nerve which M. ascribes to hyperemia of the ciliary vessels. Thus the protective substances may accumulate in cornea, sclera, and iris and the territory supplied by the ciliary vessels, which may be utilized for tuberculous and scrofulous diseases of the avascular anterior segment of the eye.

According to Frenkel, the injection is repeated every three days. If after five injections no effect is noticeable, they are better discontinued. For the sterilization of the air suction through a filter of cotton or directly through the needle is sufficient. The quantity may be from 2 to 6 ccm., which must be injected slowly to avoid air embolism, which M. observed in rabbits after rapid injections with instantaneous death. The postmortems under water revealed the presence of air in the right atrium and ventricle of the heart.

C. Z.

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SUBCONJUNCTIVAL INJECTION OF STERILIZED AIR. DELMIRO DE CEZALT. (*Wiener Medizinische Wochenschrift*, March 20, 1909). The air is sterilized either by suction through a cotton filter or by heating of the needle of the syringe. The amount of air is 2 to 6 c. c.; five injections are given in the interval of three days. This treatment is used only in diseases of the anterior eyebulb, such as affections of the cornea and epi-

scleritis. The injections diminish the pain, photophobia, tearing and blepharospasm. In cases of scleritis and episcleritis the nodules become absorbed. The effect of the injection is to be explained by the fact, that the oxygen of the injected air irritates the anterior ciliary and conjunctival blood-vessels, and an increased leucocytosis takes place. The mechanical effect is also to be considered, by this the adhesions existing between the connective tissue and the mucous membrane are torn. The forced tension of the conjunctival and episcleral tissues acts as an analgesic upon the nerve filaments.

J. G.

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CONTRACTION OF AN IRIDOPLEGIC PUPIL AFTER INSTILLATION OF DIONIN INTO THE OTHER EYE.—LAAS, DR., Frankfurt a. O., (*Deutsche Med. Woch.*, 1909, No. 17, p. 762), observed repeatedly that immediately after instillation of dionin into the right eye of a boy, who had parenchymatous keratitis, the (reflex) iridoplegic pupil of the left eye showed maximal miosis for a few minutes and then spasmodically returned to its former width. Hence L. concludes that dionin may be utilized as an innocuous means to study the lid closure reflex (of von Graefe, Westphal-Piltz), without active co-operation of the patient, which would be of great value in the insane, in whom iridoplegic pupils occur more frequently than in normal persons.

C. Z.

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ON THE ACTION OF IODINE ON THE EYE. PICK, L., Kochigsberg i. Pr. (*Zeitschrift f. Aug.* xxi., p. 304). All iodine preparations exclusively act by the iodine which is freed by the tissues of the body. Not all tissues do this, e. g., not the normal brain, mostly the testicle thyroid, and lacrimal glands. Iodine lowers the viscosity of the blood and thus accelerates the blood current. It is rapidly absorbed and is traceable after a few minutes in the secretions and excretions of the body. Taken internally, it appears after 10 minutes in the aqueous, and after half an hour in the vitreous, and is found in the conjunctiva until the excretion, chiefly through the urine, is completed after 70 hours. After instillations on the conjunctiva or subconjunctival injections it is soon noticeable in the aqueous, after from 20 to 30 minutes in the urine, and somewhat later in the vitreous of both eyes. According to Lewin and Guillery, the lens is not imbibed by iodine, but von Pfugk has shown that iodide of

potassium after subconjunctival injections enters the lens directly through the capsule.

The special effects of iodine on the eye are discussed, as ache of the lids, edema of the conjunctiva, inflammation of, and exudation from, the iris; its beneficial action in tertiary syphilis, especially on affections of the tear sac; on exudations and opacities of the vitreous after infectious diseases and general disturbances of metabolism, episcleritis, sclerosis of the retinal vessels and hemorrhages in the later stages. P. saw but subjective improvement after instillations and subconjunctival injections in incipient cataract.

C. Z.

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THE CLEARING UP OF CORNEAL OPACITIES BY METALLIC CAUSTICS.—GUILLERY (*Wiener Medizinische Wochenschrift*, Jan. 30, 1909). Corneal opacities are produced by metallic caustics, especially lime, in three ways: (1) by the chemical combination of the cornea with the caustic; (2) by the secondary reaction in the inflamed tissues; (3) by the scar formation caused by loss of substance. The primary opacity can be cleared up by a chemical solution of ammonium chloride with tartaric acid. The author begins with a 5 per cent. solution of ammonium chloride to which he adds 0.02 to 0.1 tartaric acid; the ammonium chloride solution is later increased to a 10 per cent. solution. The eye is anaesthetized with cocain every ten minutes. The solution is used as an eye-bath, which acts on the eye in three-quarters of an hour.

J. G.

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THE EFFECT OF BILE ACIDS UPON GONOCOCCI. LOHLEN (*Wiener Medizinische Wochenschrift*, March 20, 1909). In two cases of intense icterus neonatorum, there was an accompanying blenorrhoea of the conjunctiva, which had a very mild course. The copious purulent secretion of the conjunctiva was intensely yellow. It is well known that the bile has a strong bacteriolytic action upon diplococcus pneumoniae. The author found that it affects the gonococci to quite a marked extent.

J. G.

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CAN OPACITIES OF THE LENS BE INFLUENCED BY ORGANOTHERAPY? POSIK, RIGOBERT, DR. (*Wiener Klinische Wochenschrift*, March 25, 1909). Changes in the normal circulation of the blood vessels of the ciliary body as well as degenerative

processes in the ciliary epithelium disturb the retention capacity of the secretory apparatus of the eye and thus facilitate the transmission of poisonous substances into the nutritive fluid of the lens. The epithelium of the capsule of the lens is first affected and opens the way for the degeneration of the rest of the lens tissue. Whether these autotoxic products are of the form of zytotoxines or of other chemical natures, such as uric acid, etc., cannot be decided at the present time.

If the formation of cataract is the result of the circulation of poisonous substances in the blood, then it should be possible to capture these substances by some preparation of lens substance. Römer's therapeutic experiments are based on this theory. If lens substance and naphthalin is introduced into the stomach of a rabbit a cataract is developed much quicker than if the naphthalin alone is introduced into the stomach of a rabbit and 12-24 hours naphthalin is introduced, there develops a detachment of the retina, but no changes in the lens.

If a rabbit is immunized against lens proteins and is then nourished with naphthalin, this animal develops a more intense cataract than the control animals which are not immunized. The explanation of all these phenomena, the author expects to give in the future.

J. G.

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SPECIFIC ORGANOTHERAPY IN INCIPIENT SENILE CATARACT. — RÖMER, PAUL, PROF. (*Wiener Klinische Wochenschrift*, March 18, 1909.) Senile cataract, especially the subscapular form, is caused by a change of metabolism in the lens. It is the result of specific zytotoxic products of the metabolic changes in the lens. The author prepared a tablet consisting of all the elements of the animal lens and called it lentokalin. The administration of these tablets is without any danger. In case of subscapular cataract there were improvements in vision after this method of treatment. The question whether the further development of an incipient cataract can be stopped could not be decided, because the time for observation has not been long enough. Up to the present time, cases of senile cataract were treated by this method: 32 cases for 3 months, 34 cases for 6 months, 11 cases for 9 months, and 6 cases for 12 months.

J. G.

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ON THE PATHOLOGICAL ANATOMY OF OPHTHALMO REACTION. — SANGUILLANI, G. (*From the eyeclinic in the Univer*

sity of Bukarest. *Klin. Mon. für Aug.*, April, 1909, p. 422), examined pieces of conjunctiva, exercised 24 hours after positive reaction to 2 drops of tuberculin 1-100, and found as the most striking feature the enormous thickening of the subepithelial layer, caused by increase of the fixated tissue cells and leucocytes. The upper zone is characterized by larger lymphatic spaces filled with edematous fluid, polynuclear and large mononuclear cells. The blood vessels are ectatic and choked with red blood corpuscles, the endothelium of the capillaries is thickened and they contain mono- and polynuclear leucocytes. The epithelium is in a state of opaque swelling some cells are very much enlarged and edematous. In short, it is an acute conjunctivitis with predominance of mononuclear cells and lymphocytes, no tubercle bacilli. C. Z.

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ON THE EFFECT OF INSTILLATION OF TUBERCULIN INTO THE CONJUNCTIVAL SAC.—STARGARDT, K., (*From the eyeclinic of Prof. O. Schirmer in the University of Strassburg. Zeitschrift für Augenheilkunde*, xxii., Juli, 1909, p. 1), gives a very good review on ophthalmo-reaction with abundant utilization of literature. As the use of different preparations by different authors renders origination rather difficult, the general use of one preparation is advocated for exact comparison. Krause and Hertel proposed old Tuberculin of Koch.

A detailed histological description of phlyctenae which developed in 2 of S.'s cases after instillation of tuberculin. S. sets forth the dangers of the method and reaches the following conclusions: Considering the material from a clinical, surgical, and anatomo-pathological standpoint the positive ophthalmo-reaction speaks with great probability for tuberculosis, but it is not a certain diagnostic means. The instillation into diseased eyes today is strictly avoided by ophthalmologists, on account of the frequent serious consequences and because nothing is gained by it for the diagnosis of the ocular disease. The instillation into the healthy eye does not give any clue for the diseased eye, as a reaction may be elicited by any tuberculous focus in the body. Therefore, the conjunctival reaction has no value for ophthalmological cases.

The probatory tuberculin injection is a much more reliable method. If the general reaction after subcutaneous injection, is positive and if a local reaction occurs, we can say with cer-

tainty, that we have a tuberculous eye disease. The contraindications to the conjunctival test for not ophthalmological purposes must be much more strict.

The author then discusses the cutaneous method of von Pirquet and its modifications and believes that the recently found facts on anaphylaxis may possibly gain greater importance for diagnosis. After Besredka has shown that the anaphylaxis may be propagated to animals, even of a different species, Yamanouchi produced anaphylaxis for tuberculin in rabbits by injecting 5 ccm. of blood of tuberculous persons, followed in a few minutes by intense dyspnea, paresis of the limbs and in from  $1\frac{1}{2}$  to 2 hours death under convulsions. Nothing certain can, however, be said on this method, as the number of examined cases is still too small. The experience of Waldstein is sufficient to warn against the therapeutic instillation of tuberculin.

The very complete bibliography at the end will be very welcome.

C. Z.

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TREATMENT OF THE EYE WITH TUBERCULIN. JUNIUS, DR., Coeln. (*Zeitschrift für Augenheilkunde*, xxi., p. 427). The object of J.'s paper is to arouse an exchange of opinions, whether a modification of the now prevalent method of treatment with tuberculin is a general desideratum and whether it is possible. At first he reviews some of the most important points derived from the so far extant investigations. The view that a manifest tuberculous affection of the eye in an individual which from the clinical aspect is otherwise healthy, is to be considered as primary tuberculosis and requires enucleation, is discarded. Not the tuberculous organ, but the tuberculous person is to be treated and to be cured. The eye is, like the testicle, an organ of predilection for early tuberculous disease. The tuberculosis of the eye is benign in a small minority of cases, in a large majority it may lead to the loss of the eye and more frequently to generalization of tuberculosis, if not treated successfully. The favorable influence of tuberculin on ocular tuberculosis is generally recognized, and tubercular treatment, if carefully administered, is innocuous.

With regard to the value of the different kinds of tuberculin, all have proved effectual, although all have their shortcomings. According to Sahli, only toxic, not bacterial, im-

munity is obtainable. The old tuberculin of Koch contains only the tuberculous toxin, his new tuberculin and his bacilli emulsion also contain the crushed bodies of the bacilli (for a possible bacterial immunity). The emulsion is a mixture of old and new tuberculins. From practical experience Koch's old tuberculin is applicable in patients without fever, new tuberculin and emulsion in all cases. The so-called mild treatment with very small doses, avoiding any stronger reaction (noticeable by rise of temperature and local reaction), must be the rule.

In ophthalmology so far new tuberculin of Koch was used, upon the recommendation of A. von Hippel, and more recently also bacilli emulsion, by Davids, late assistant of von Hippel's clinic. Von Hippel, however, desires a more effectual preparation, as new tuberculin gave good first results, but frequently relapses occurred. J. attributes these to the fact that by the subsidence of the ocular changes, which never are primary, the cure is not complete, but only if the source of infection of the eye and the cause of possible relapses are cured, which may be obscure but proven by tuberculin reaction or Roentgen rays.

J. thinks that von Hippel's method with new tuberculin will not find favor in ophthalmological practice, as it must always be freshly prepared. Beraneck's tuberculin (which may be procured from Prof. Beraneck, Neufchatel, 10.00 for \$1.00), recommended by Prof. Sahli, is decidedly preferable on account of its simple applicability. It comes in different solutions, which keep for from 2 to 3 months, ready for use. The initial dosis for children under 12 years is 1/xx. ccm. of solution Beraneck A. 128, for adults 1/20 ccm. A. 32. Two injections per week are sufficient.

According to the experience of von Hippel, Davids, and others, quite a number of ocular affections, besides tuberculous iritis and conjunctivitis, are amenable to tuberculin treatment, especially diseases of the cornea and uvea, which by finer diagnostics may be found to be of tuberculous origin. This is very important, as, according to Schieck, ocular tuberculosis, particularly of the iris, in children in the first decennium takes the most unfavorable course. Early tuberculin treatment of these affections is necessary, to obtain results. From his observations in well managed institutions for tuberculosis,



J. considers the careful tuberculin treatment as at least harmless and thinks that the following conviction of Sahli may be realized, viz. that mild tuberculin treatment by the possibility of reaching prophylactically initial or suspected cases, has a great future and is called upon to play a similar beneficial part as vaccination in the combat against smallpox.

C. Z.

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VON PIRQUET'S TUBERCULIN TEST IN THE NEW BORN AND THEIR MOTHERS.—POTEN, DR., and GRIEMERT, DR., Hanover, (*Deut. Med. Woch.*, 1909, M. 22, p. 793), report their investigations with von Pirquet's test on 53 infants at the ages of from 1 to 14 days. Not one of them showed a trace of reaction. This corresponds with the general experience that tuberculosis is exceedingly rare in infants, in proportion to the millions of children that are born every year or the thousands that are found free from tuberculosis at autopsies, save in generalized affection of the mother and then only very exceptionally. The authors conclude that negative reaction to Pirquet's test, especially if repeated a second time, with pure tuberculin, occurs only in people perfectly free from tuberculosis, as the new born are. The positive reaction, even if only slight or belated or at the 2nd test, indicates a tuberculous focus in the body which, however, need not be active or progressive. On account of its sensitiveness, the cutaneous test apparently indicates every, even the most harmless, focus of tuberculosis, and therefore is not sufficient for the diagnosis of active tuberculosis.

C. Z.

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RADIUM TREATMENT.—LAWSON, ARNOLD, and DAVIDSON, MCKENZIE. (Report of the July meeting of the Ophthalmic Society of the United Kingdom, *Brit. Med. Jour.*, July 9, 1909). The authors presented a preliminary note on the treatment of eye diseases by radium. Mr. Lawson said the cases had been selected from the out-patient clinic of Moorfields Hospital, and were selected as instances of maladies which usually proved obstinate or only improved slowly under the ordinary forms of treatment, or else were of an active or virulent nature and so required drastic measures. Only 17 cases had so far been tried, but in every case the result of exposure to radium had been very encouraging. Most of

the cases were corneal ulceration, four were non-ulcerative lesions, and one was episcleritis. After one application of five minutes to a hypopion there was distinct benefit. For instance, a man, aged 35, gave a history of injury to the right eye; there was deep ulceration and grey infiltration of an area of 4 mm., with a large hypopion; twenty-nine milligrams of radium were applied for five minutes and five days later the injection was subsiding and the hypopion had disappeared; two days after a second application of three minutes the man was discharged from the hospital, the eye being not quite white, but, for all practical purposes, well. Other cases also did very well from the treatment. In all cases the only other measures used were boracic lotions and atropine. Some punctate erosions were similarly treated, and gave equally encouraging results, as did also cases of old-standing trachomatous pannus except in one case, in which there was increased vascularity after the treatment. The dosage of radium was an important point, and the small dose of 5 mg. seemed to act as quickly as did a much greater quantity. In one case the pain after the application endured for three days, but in the others the longest time was twenty hours. The paper is a tentative one. The radium was applied in sealed glass tubes, the glass cutting off the alpha rays, so that the beta and gamma rays only passed through the lesion.

C. H. M.

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SPRING CATARRH TREATED AND CURED BY RADIUM. -DAVIDSON, MCKENZIE and LAWSON, ARNOLD, London (Report of the May, 1909, meeting of the Ophthalm. Society of the United Kingdom; *Med. Press*, May 12, 1909). The patient was a boy, aged 12, who suffered from chronic photophobia, lacerimation, and slight conjunctival discharge, which had persisted for nearly a year. Both tarsi were covered with dense hard excrescences, closely aggregated, and separated by deep narrow fissures. The retro-tarsal tissue was swollen and hypertrophied, and the viscid discharge was spread over the conjunctival surface. The disease was confirmed by examination of the discharge. The irritability was chiefly marked in the morning. Yellow mercuric oxide was used, but no benefit resulted, and it caused too much pain. A week later he had eupric sulphate drops, of a strength of one grain to the ounce. Bicarbonate of soda and hydrocyanic acid gave relief, and

weak copper sulphate drops were used from time to time still. He then consulted with Mr. McKenzie Davidson as to the possibility of treating the case with radium. It was carried out for a year, during which period each eye was treated eight times. No pain or other immediate effect was produced, but the granulations gradually subsided. After the eighth application he was quite cured, but the interval before reading the communication was to make quite sure there had been no recurrence for a good time: 39 milligrammes of radium were used for 15 minutes at first, and then 44 milligrammes.

C. H. M.

ROENTGEN RAY FLASHES OR INTERMITTENT X-RAYS IN THE TREATMENT OF EYE DISEASES, WITH REPORT OF CASES.—COOPER, DAVID H., Denver (*Ophthalmic Record*, July, 1909). The X-rays possess sedative, stimulant, irritant and escharatic properties. In the intermittent ray the purely stimulative and irritative rays can be separated. By so doing the regenerative action is increased. The continuous ray is degenerative, the intermittent ray is regenerative. Regeneration is brought about through lowering of the tension, improvement of the circulation and an increased leucocytosis. In addition to the local effect, there is a general one of a tonic nature. Cellular metabolism is increased and all the vital processes are stimulated. Roentgen ray flashes are made by an apparatus especially designed for the purpose. It consists of a small motor, a condenser, and a moving shaft. By the aid of a regulator, from 40 to 600 flashes can be given per minute and their number recorded. In children and young adults the body is placed behind a lead screen, but adjacent parts of the face are not protected unless the patient is a pronounced blond. In all nine cases are reported, four of which were corneal ulcers which healed under this treatment alone in a shorter period of time than could have been expected by the usual methods of local treatment. One was a case of serous iritis which had no other treatment whatever and made a complete recovery in about two weeks. Three were cases of optic nerve atrophy of long standing. The visual improvement was manifest in each case, but was not sufficient to do more than suggest the greater possibilities in cases of more recent origin. One was an old case of cyclitis with vitreous degeneration, in which there was some clearing of the vitreous and improvement of vision.

M. B.

STAPHYLOCOCCUS VACCINATION IN PHLYCTENULAR DISEASE.—GRADLE, H., Chicago (*Ophthalmic Record*, June, 1909). The author believes the predisposing cause of this disease to be tuberculosis, but that in many cases the exciting cause is staphylococcus infection. Cultures made from the cornea in a number of his cases showed the presence of this germ in large numbers. On the strength of it he instituted vaccine therapy and his conclusions are that there was no sudden change in any case. None got well faster than cases occasionally do. But in every instance the improvement was continuous and they were well in from two and a half to four weeks.

M. B.

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### MUSCLES.

THE TREATMENT AND MANAGEMENT OF STRABISMUS.—RAY, VICTOR, Cincinnati, (*Lancet-Clinic*, June 19, 1909), emphasizes the importance of the education and stimulation of the functional activity of the retina in the first few years of a child's life, since if a considerable period of non-use intervenes, the visual activity and function remain unimpaired, as illustrated in cases of congenital and senile cataract. When the former is not removed for three or four years, the eye is highly amblyopic, while in the latter normal vision is often obtained after the eye has not been used for many years. He mentions the fact of convergent squint usually occurring in hypermetropes, divergent in myopes, stating etiological factors of both. After determining accurately the refraction of the eye of a child, he advises the determination of the angle of deviation by means of the tangent deviometer of Worth. The training of the fusion sense by Worth's amblyoscope is described. In determining whether to do an advancement or tenotomy or both, or a tenotomy on both eyes, each case is decided by means of the knowledge of amount of squint measured accurately by the deviometer, and the limitation of movement as shown by Steven's tropometer. Special indications for different forms of operations are mentioned.

M. D. S.

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A CASE OF PARALYSIS OF THE INFERIOR OBLIQUE MUSCLE OF THE LEFT EYE.—COHEN, MARTIN, New York, (*Arch. Ophthalm.*, May, 1909, xxxviii, 282), gives the clinical history of a case of paralysis of the inferior oblique muscle present in a child aged seven and one-half years. He considers it probable

that it was due to a developmental muscular defect of congenital origin.  
W. R. M.

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REFLEX MECHANICAL NYSTAGMUS AND PLUG OF CERUMEN.—SEBILLEAU AND LE MAITRE (*Annales d'Otologie*, March, 1909).

Sebileau and Le Maitre report a case in which slight pressure on a plug of wax in the auditory canal produced dizziness and marked nystagmus, and discuss the physiology and pathology of nystagmus.  
G. C. H.

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INVOLUNTARY MOVEMENTS OF PALPEBRAL ELEVATION ASSOCIATED WITH THOSE OF THE JAW AND THE FACE. CANTONNET. (*Archives d'Ophthalmologie*, April, 1909.) Cantonnet reports one of those curious cases of "jaw winking," quite a number of which have been recorded. In this case the condition was acquired which is unusual. Their pathogeny is very obscure.  
G. C. H.

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ESOPHORIA, ITS SYMPTOMS, SIGNIFICANCE AND TREATMENT.—WILKINSON, OSCAR, Washington (*Ophthalmic Record*, June, 1909). The most important symptom is basilar headache. The author lays great stress upon this symptom and when present expects to find exophoria. He believes that exophoria causes more nervous breakdowns than any other single lesion of the eye. In the treatment he uses prisms for the low degrees which fully correct the exophoria. In high degrees from one-half to two-thirds full correction is recommended. He exercises the interni. He advises operation when the error is high and where relief is not obtained by the use of partially correcting prisms. He advises advancement for deviations of less than 6°. When above 8° he tenotomizes one externus. He has no faith in partial tenotomy. In deviations of from 12° to 20, especially with diplopia, tenotomy and advancement are indicated. M. B.

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### OPERATIONS.

ON INCISIONS OF THE EYE, WITH SPECIAL REFERENCE TO INCISIONS FOR THE EXTRACTION OF CATARACT AND FOR THE RELIEF OF GLAUCOMA.—McKECHNIE, W. E., Jullunder, Punjab. (*Arch. Ophthal.*, May, 1909, xxxviii, 227), discusses, from a mechanical, anatomical and physiological, pathological, and technical aspect, the most suitable incision to be made for

the extraction of cataract and for the relief of glaucoma. He shows the effect of intraocular pressure on different forms of corneal and corneo-scleral incisions, from a mechanical standpoint, and shows that the magnitude of the force at the wound margin causing gaping in the case of the scleral incision is more than one and a half times greater than that causing gaping at the wound margin in the case of the corneal incision; while the force tending to keep the wound closed is about twice as great in the corneal case as it is in the scleral. This, the author states, is due to the difference of angle which the plane of the incision makes with the radii of curvature, and is of special importance in operations for glaucoma and in its relation to the production of astigmatism in cataract operations. He shows that after an incision of the corneal tissue there is swelling of corneal fibres and arrest of the lymph stream and that when this occurs in a radial incision it causes rapid sealing of the wound with least amount of deformity of the corneal surface, is less liable to infection, and less likely to reopen. As objections to the radial corneal incision the author refers to interference of the scar with vision; difficulty of extraction through the incision; difficulty of making the incision. In regard to interference of the scar with vision, after radial incision such as he illustrates, the author shows that ample pupillary space is left and that the scar is practically covered by the upper lid, and that the corneal incision reduces to a minimum the chances of iris or vitreous healing in the wound. As regards extraction through the incision he has found the particular form of corneal incision which he advocates to be large enough to allow delivery of the lens in its capsule.

The author gives the technic in making the corneal incision and believes that, when properly executed, it is easier to make than the corneo-scleral flap incision.

The article is illustrated.

W. R. M.

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AN ORIGINAL AND ABSOLUTELY RELIABLE SUTURE FOR TUCKING OR SHORTENING AN OCULAR MUSCLE. SUEFA, G. A., Boston, Mass. (*Arch. Ophthalm.*, May, 1909, xxxviii, 254), describes a tucking operation for which he claims the following advantages: 1. Accurate measurement of the amount of adjustment to be made. 2. Absolute reliability in holding the muscle where placed. 3. Suture properly placed, avoiding torsion. 4. A single removable silk suture, giving firm union

5. Simplicity of operation, the muscle remaining in its original position until suture is tied. 6. The ability to correct large errors without disturbing the primary tendinous attachment.

The article is illustrated and the operative technic is fully described.

W. R. M.

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THE OPERATIVE TREATMENT OF PAPILLOEDEMA DEPENDENT UPON INCREASED INTRACRANIAL TENSION. DE SCHWELNITZ, G. E., and HOLLOWAY, T. B., Phila. (*Therapeutic Gazette*, July 15, 1909.) The writers present a very exhaustive exposition of this subject and conclude with the following:

1. The most satisfactory treatment for the purpose of preserving vision in any case of choked disc or papilloedema not due to a toxic process or constitutional disease ("infectious optic neuritis"), but depending upon increased intracranial tension, is decompressive trephining, with the removal of the growth if it is accessible.

2. This operation should be performed early, and if it can be done during the first, second, or even the third stage of papilloedema, the prognosis as to sight is most favorable.

3. If for any reason the operation is postponed until the development of the fourth and fifth stages of papilloedema, already associated with marked depreciation of vision, the prognosis as to sight is unfavorable, but even under these circumstances the operation should be performed because it sometimes preserves such vision as still remains.

4. In non-syphilitic cases, time devoted to the administration of iodides and mercurials is time wasted, but after the operation their exhibition appears to exert a beneficial influence.

5. The investigation of the eyes must include not only an ophthalmoscopic examination, but also a careful estimation of the visual field, the color perception, the light sense and size of the blind spot.

6. Patients afflicted with papilloedema depending upon increased intracranial tension should have the case fairly stated to them, and the operation should be urged in spite of the occasional unfavorable results, because in its absence ultimate blindness is almost always sure to result.

C. H. M.

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THE SURGICAL TREATMENT OF OPTIC NEURITIS. NANCE, WILLIS O., Chicago. (*Jour. Ophthal. and Oto-Laryng.*, May,



1909, iii., 171), draws the following conclusions from a study of literature on decompression operations for optic neuritis:

1. Operative procedures for the relief of papilloedema in suitable cases offer by far a better prognosis than treatment by drugs.

2. Free opening of the skull and dura, in cases where the tumor cannot be localized, is the operation of choice.

3. The operation to be of benefit must be performed early, before secondary and permanent changes occur in the nerve and other ocular structures. The time when vision begins to fail may be tentatively adopted as the time to operate.

4. Operative measures involving the opening of the skull and dura in papilloedema dependent on anemia, toxæmia, albuminuria, sinus disease, etc., are contraindicated, hence the necessity of thorough examination of the blood, urine and an investigation of neighboring cavities before advising such radical procedures.

5. In cases of tumors implicating the basal visual tracts, decompression cannot prevent loss of sight. W. R. M.

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FURTHER CONTRIBUTION TO THE OPERATIVE EXPOSURE OF THE CHIASM, HYPOPHYSIS, AND ANTERIOR REGION OF THE PONS.—LOEWE, L., Berlin. (*Zeitschrift für Aug.* xxi., p. 447.) In Vol. xix. of the *Zeitschrift*, (reviewed in *Ophthalmology*), L. describes a method how to approach these parts through the pyriform aperture after longitudinal cleavage of the external nose and removal of the turbinated bodies and ethmoidal bone, which has been performed in the living seven times for the extirpation of tumors of the hypophysis. In the meantime an entirely different, much simpler, procedure has been found. To reach tumors of the hypophysis which have grown into the sphenoidal sinus means to expose the roof of the latter. As the sphenoidal bone lies immediately above the pharyngeal vault, it is only necessary to incise the mucous membrane and push it aside to lay bare the inferior surface of the body of the sphenoidal bone. If this is removed the sphenoidal sinus is opened and the hypophysis tumor reached. Thus the whole problem is to expose the roof of the pharynx. Therefore the experiences of the surgeons in operations for tumors of the naso-pharynx must be utilized, and are discussed. From these L. concludes that the incision above the hyoid bone is the most

expedient. He then expounds the relations of the sphenoidal sinus to the overlying parts of the central nervous system.

C. Z.

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THE ELECTRO MAGNET IN REMOVAL OF IRON AND STEEL PARTICLES FROM THE EYE. —RAY, VICTOR, Cincinnati. (*Ohio State Medical Journal*, May 15, 1909), compares the utility of the giant Haab and hand Hirschberg magnets. He emphasizes the fact if near to the point, say within less than  $\frac{1}{4}$  the diameter of the eye, a magnet with 1/16 the strength will have the same power as a large magnet with sixteen times the attractive force at the full distance of the eye. The writer prefers the use of the small magnet through a scleral opening, and considers the probability of infection in this way very slight. He does not think it advisable when the injury is more than an hour or two old to use the wound of entrance. He considers the sideroscope unsatisfactory and the pain reaction unreliable. After locating the foreign body by means of the X-ray, the hand magnet with scleral incision is used under general anesthesia, using a nickel-plated brass speculum and forceps. A space between the muscles is selected and a triangular conjunctival flap with its apex extending well forward to within three or four millimeters of the limbus is made, having a broad base extending if necessary to the transitional fold. The incision is then made at the nearest point possible to the location of the foreign body as previously determined and parallel to the equator of the eye, thus cutting as few of the chorioidal and retinal vessels as possible. It is generally sufficient to bring the magnet over the lips of the incision, but occasionally on account of exudates around the F. B. the tip may need to be introduced farther into the vitreous or if the Haab magnet is at hand, by careful manipulation the greater force may be applied to the wound. In using the Haab magnet, it is well to place the patient on the side so no slip of the mechanism may let the weight of the heavy magnet fall on the patient's eye. After the F. B. has been extracted, the wound is flushed with a sterile salt solution, no stitch is placed in the sclera, the conjunctival flap is stitched in place, a firm bandage is applied, and the patient kept quiet in bed for several days. The eye should be examined and bandaged daily. Atropine sol. is instilled to keep the ciliary muscles under control. Three cases are reported.

M. D. S.

## OPTICS.

UNIFICATION OF THE NOTATION OF VISUAL ACUITY AND OF THE MERIDIANS OF ASTIGMATISM.—JESSOP, W. H. H., London (*Medical Press*, June 25, 1909). The committee, after consideration, came to the following conclusions: (1) That the meridians of astigmatism should be measured and represented as the observer looked at the patient. (2) That the axes should be measured and represented in the lower semi-circle of the trial frame. The numbering of the axes should start from the middle line of the face in each eye, and proceed downwards and temporalwards. The zero would therefore lie at the nasal end of the semi-circle, and 180 degrees at the temporal end; 90 degrees would be below and midway between these points. The committee also agreed that for international test type, numbers should be used. Landolt's ring was also thought to be a suitable object. The unit of measure was an angle of 1 minute, and the figures were to be constructed on this unit. The types were to be constructed as regards size on arithmetical progression, and the standard distance at which they were to be seen should be 5 metres. The source of light was to be diffuse daylight, if possible, opposite the types, and not laterally. C. H. M.

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NEW PHOTOMETRIC UNITS AN IMPORTANT INTERNATIONAL AGREEMENT. (*Scientific American Supplement*, July 10, 1909). An article from the *Electrical World* says that the unit of light at the Bureau of Standards, Washington, has been maintained through the medium of a series of incandescent electric lamps, the values of which were originally intended to be in agreement with the British unit, being made 100/88 times the Hefner unit. The unit of light at the Laboratoire Central, Paris, is the bougie decimale, which is the twentieth part of the standard defined by the International Conference on Units of 1884, and which is taken, in accordance with the experiments of Violle, as 0.104 of the Carcel lamp. The unit of light at the Physikalisch-Technische Reichsanstalt, Berlin, is that given by the Hefner lamp burning at normal barometric pressure (76 centimeters) in an atmosphere containing 8.8 liters of water vapor per cubic meter. The unit of light at the National Physical Laboratory, London, is that given by the 10-candle-power Harcourt pentane lamp burning at normal barometric pressure (76 centimeters) in an atmosphere containing 8 liters of water

vapor per cubic meter. Proposed new unit = 1 pentane candle = 1 bougie decimale = 1 American candle = 1.11 Hefner unit = 0.104 Carcel unit. Therefore, 1 Hefner unit = 0.90 of the proposed new unit. The pentane and other photometric standards in use in America will hereafter be standardized by the Bureau of Standards in terms of the new unit. This, within the limits of experimental error, will bring the photometric units for both gas and electric industries in America and Great Britain and for the electric industry in France, to a single value, and the Hefner unit will be in the simple ratio of 9/10 to this international unit. The attitude of the electrical and gas interests on the new unit are discussed and difficulties and advantages in its adoption mentioned. The question is discussed at some length.

M. D. S.

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MEASUREMENTS OF THE RAPIDITY OF PERCEPTION OF FORM.—GUILLERY, H., Coeln (*Archiv. für Augenheilkunde*, 62, 1908, p. 227). In a previous paper (*Archiv. für Augenheilkunde*, 51), G. proved the fallacy of the principle on which the test types are constructed that the recognition of form be dependent upon the visual angle. The best means to demonstrate the different requirements of the visual organ for the recognition of letters is to ascertain the time necessary for seeing letters of different sizes, or, vice versa, to measure the distance, and thus the size of the retinal images, necessary to recognize, in the same time, various series of letters of equal size.

G. selected the latter method: A black letter or number on a white field was illuminated with artificial light, so that it could be seen at the distance required by Snellen's test. The observer looked through a long black tube. The time was  $\frac{1}{4}$  of a second. The tabulated results illustrate the great difference of the distances at which the various letters were recognized from those at which they ought to be recognized according to Snellen's method. The experiments demonstrate that the requirements of the visual organ, i. e. by central processes, for discerning different letters varies considerably with the selection of letters.

C. Z.

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THE PROGRESS OF THE METALLIC FILAMENT LAMP. WADE, HERBERT T. (*Scientific American*, June 5, 1909), traces the progress from the ordinary carbon filament lamp to the tungs-

ten which gives three times the illumination for the amount of current consumed. He calls attention to the proper arrangement of lamps for different rooms and the use of suitable reflectors and shades. He says, "The most satisfactory arrangement of lights for almost any size of room is to group them symmetrically at or near the ceiling, and by knowing the foot-candles per square foot of area a given lamp will give, select and so place the units that the distribution will be uniform. This can be tested by taking a series of stations at various points in the working plane, and then computing the intensity of illumination in foot-candles at each of these stations. For each style and size of lamp, together with its systems of reflectors and shades the manufacturers prepare tables showing the value of its illumination in foot-candles when placed at different heights above the working plane, not only directly beneath the lamp, but at various distances from a point directly beneath. In this way can be found the number of foot-candles that each lamp produces at a single station, and then taking the sum of these effects, the total illumination at that point is obtained."

M. D. S.

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THE VARIOUS TYPES OF GAS LAMP.—WARE, R. C. (*Scientific American Supplement*, June 12, 1909), says that although exhaustive researches have been made regarding the efficiency of electric lamps in common use, but little data has been given regarding the practical efficiency of different forms of gas lamps. The writer has chosen for the problem a rectangular room 50x30 feet and 12 feet high. For lighting this 1500 square feet he has worked out the number and position of different varieties of lamps required to supply 4500 lumens, and gives a table showing comparative values in dark and light rooms. The highest number of lamps needed is that of the open burner, 69 lamps being required, the number growing less in the eight single burners named till it reaches the lowest, the inverted mantle equipped with prismatic distributing reflector. Only 10 lamps are required for producing the specific 4,500 lumens. It would, however, be inadvisable to hang these lamps at the usual height of 7 feet, better results being obtained at the height of about 8.5 feet. He emphasizes the necessity of co-operation between architects, builders, and illuminating engineers to prevent waste of light by the use

of color schemes of low reflecting value. Where the reflector is used there is the advantage of the major part of the light being direct, whereas, in the case of the open lamp a very large part of the light falling upon the plane of illumination, is completely diffused. For purely general illumination, the latter case may be desirable, but for any definite work there should be a definite direction to the light so that fairly distinct shadows may be utilized. It is found also that the purely diffused lighting system entails a serious strain upon the eye, there being practically no shadows on which the retina may be directed when fatigued; the light enters the eye from all directions, below as well as above. This is true to a less extent where the illumination is general and largely reflected from walls and ceiling, as in the case of the bare lamp, but is largely reduced by the use of the reflectors for directing the light downward. The character of the surfaces constituting the plane of illumination, of course, has a very marked effect in this regard, a surface largely light-colored reflecting a great deal of light directly into the eye. There is also data given showing the consumption of gas per hour per square foot of the plane in question required to give an illumination of 1 foot candle.

M. D. S.

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THE LIGHTING OF SHIPS AND LIGHTHOUSES. —CLAIBORNE, J. H. (*United States Naval Institute Proceedings*, Vol. 34, Abstr.; *The Dioptric Review*, Apr., June, 1909, No. 3, Whole No. 127). Let it be remembered that to the green-blind man, green seems like a dirty grey, and that to the red-blind man red is green. A pilot totally color-blind for red will, of course, see green when he looks at the port light, and may think it is the starboard. A green-blind man will see dirty white when he looks at the green or starboard light. But again, let it be remembered that complete red and green-blindness sometimes escapes detection, and that those partially blind for red—and particularly those for green—frequently escape detection.

The partially red-blind man is not so great a source of danger, because his vision at least gives him the idea of a modified green, but the partially green-blind man may readily mistake certain shades—particularly light ones—of green for white, and the fact that the misty atmosphere often causes confusion when green is looked at by those with normal color-

perception has already been sufficiently emphasized. It is this man, the partially green-blind one, who is the fruitful source of danger in seafaring.

To sum up, the present system has the following disadvantages:—

1. The possibility of total color-blindness for red or green.
2. The possibility of partial color-blindness for red or green.
3. The confusion which exists in the mind of most men as to the distance of red and green lights.
4. The added confusion which is caused by comparing red and green and white.
5. The reliance for the estimation of distance upon the intensity or brightness of a light.
6. The utter impossibility of judging the distance of a single light by the increase of its size in approach or regression respectively.

The advantages of the system herein suggested are:

1. The elimination of color-blindness, partial or complete.
2. The absence of the mental confusion which results from the simultaneous comparison of red, green, and white, or any two of them.
3. The substitution of red and green by a uniform standard—white—recognisable by all who have the requisite amount of vision for seafaring.
4. The employment of definite geometrical figures to indicate the starboard and port—a star for the starboard and two lights in a vertical series for the port.
5. The reliance for estimation of distance upon a known visual angle, determinable by the range-finder with mathematical accuracy.
6. The possibility of the estimation of the angle at which a ship is being approached on the starboard by the changing angles at which the horizontal vertices of the parallelogram are seen.
7. The substitution of the white parallelogram for coast light-houses in place of those at present in use. H. V. W.

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AN IMPROVEMENT IN THE CROSS-CYLINDER.—RHODES, J. N., Philadelphia (*Ophthalmic Record*, April, 1909). The cross-cylinder is made much more efficient by having an empty ring attached to its handle. This ring should be of the same size



as the ring in which the cross-cylinder is set. The empty ring should be so placed that it can be closed over the cylinder and opened for use so that it will stand off at a right angle or at an angle of 30° from the other ring. The object of this empty ring is that it may be quickly used instead of the cylinder in order to verify the answers of the patient. M. B.

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### OPTIC NERVE.

ON THE HEALING COURSE OF A CASE OF BILATERAL PAPI-  
LITIS.—FEJER, JULIUS, Budapest. (*Centralblatt für Prakt.  
Augenheil.*, June, 1909, p. 167). A laborer, aged 33, suddenly  
complained of severe headache and impairment of vision.  
Within two days he became completely blind. He stated that  
in his third year his body was covered with reddish rashes. The  
only abnormal symptoms were: headache, pulse 60, vision  
reduced to perception of light, bilateral papillitis, swelling of  
discs  $\frac{3}{4}$  mm. The enlarged pupils acted very sluggishly. The  
diagnosis of tumor of the brain was made and, although syph-  
ilis was denied, mercurial inunctions, 3.00 per day, were or-  
dered. After a week the patient began to see and, after in-  
unctions of 60.00, V rose to 5/vii, pulse to 90, headache oc-  
curred less frequently. The papillitis disappeared with slight  
decoloration of the temporal halves of the discs and V 5/vii.  
From the therapeutic results a syphilitic tumor was assumed.

C. Z.

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### ORBIT.

A CASE OF UNILATERAL EXOPHTHALMUS.—LUSTIG, ALFRED.  
Meran-Franzensbad (*Deutsche Med. Woch.*, 1909, No. 16, p.  
716). A girl, aged 18, noticed in the spring of 1907, that  
her right eye bulged more and more, so that after three months  
there was intense exophthalmus, without distressing symptoms  
or failure of sight. There was no evidence of Graves' disease.  
The diagnosis of sarcoma was made and an early operation  
advised, which was refused. In June, 1909, severe headache,  
neuralgia of the infra- and supraorbital nerves, symptoms of  
compression of the brain, complete amaurosis of the right eye  
and failure of vision of left eye set in. At the examination  
the visual field of the left eye was contracted and papillitis was  
ascertained. At the operation on the following day a small  
celled sarcoma, starting from the optic sheath, and filling the

whole orbit, was found which necessitated exenteration of the orbit. The tumor had destroyed the bone around the optic foramen and had spread along the dura mater into the cranial cavity. The wound healed rapidly and V and Visual Field of left eye were perfectly restored. The long postponement of the operation, of course, rendered the prognosis doubtful.

C. Z.

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### PHYSIOLOGY.

THE EARLY APPEARANCE OF THE IRIS LIGHT REFLEX IN THE COURSE OF FOETAL DEVELOPMENT.—MAGITOT (*Annales d'Oculistique*, March, 1909).

The infant born at term or when a few weeks old presents a decided light-reflex and Magitot, to determine at what stage of development it commences, examined fifty prematurely born infants. As before eight months examination by direct light is impossible on account of the haziness of the cornea and the dull color of the iris, the examinations were made by diascleral illumination with electric light.

He found that the light reflex appears at about the end of the fifth month, at which time the development of the visual cells, the origin of the nuclei of the third pair and the maturity of the sphincter are well advanced.

Attention is called to the fact that the fibers of the optic nerve can transmit luminous impressions at a time when the central tracks are hardly existent and when the hyaline sheath of the nerve itself is wanting.

G. C. H.

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MEASURING INVESTIGATIONS ON THE YELLOW COLOR OF THE HUMAN LENS AND ITS INFLUENCE ON THE SIGHT.—HESS, CARL, Würzburg (*Archiv. für Augenheilkunde*, 63, 1909, p. 164), measured, in the dark adapted eye, by a very ingenious method, which must be read in the original, the absorption of the blue rays by the lens by comparing the luminosity of a surface, emitting chiefly blue rays, with another surface, emitting only such rays, which, like the reddish yellow, are scarcely or not at all absorbed by the lens. Through a sufficiently small fissure of the Epicotister the dark adapted eye sees two colorless surfaces which, in general, appear differently luminous, but, by adjustment of the illumination of one surface in shifting

the corresponding lamp, can readily be brought to the same luminosity.

Testing his own eyes, H. found for a distance of 42.4 cm. for the yellow surface, 39 for the blue surface, to make both appear equally luminous, and for an aphakic person 45 cm. for the blue surface, after proper correction. This value corresponds to the luminosity which must be given to the blue surface for obtaining the equation of luminosity if no rays are absorbed by the lens, and is called 1, for comparison with the values found in non-aphakic eyes at different ages. A table of measurements of 20 eyes of persons of different ages, illustrates the great individual differences of the yellow color of the lens, with which the ophthalmic surgeon is familiar from the extraction of cataract. Above the 50th year, H. found, without exception, that more than half of the impinging blue rays were absorbed by the lens, while below 50 the absorption reached in no case 0.5. If a yellow prism of angle  $5^\circ$  (Zeiss), 6 cm. high, at the base 8 mm. thick, is placed in a proper position, nearer or farther from the edge, before an aphakic eye, the equation of luminosity of an examined non-aphakic eye can be matched for the aphakic eye. Thus a pretty true picture of the actual yellow color of the lens of the examined eye is gained. By measuring the specific absorption of the prism at distances of 1, 2, 3, 4, 5, 6, 7, cm. from the edge and marking them, H. constructed a convenient gauge for ascertaining the specific absorption of extracted lenses, and found that an absorption of more than 9/10 of the impinging blue light is not rare in lenses of older people.

So far the direct observation of the color of the lens in the living eye was impossible until Hess devised a new method by means of a Nernst lamp and a convex lens of short focal distance fastened in a tube. Into a clasp before the lens various colored glasses can be inserted, allowing oblique illumination with colored lights of comparatively great intensity. With a blue glass the pupil of juvenile persons appears very dark, almost colorless, from the 20th to 30th year with a greenish tint, which becomes more pronounced with increasing age. Between the 50th and 60th year the pupil of normal eyes shines nicely green, frequently lighter than the iris. If the glass lets through more green or yellowish green rays, the pupil appears, with advancing age, dark yellow.

Hess shows that by these methods, which he calls Xanthometry of the lens, quite a number of questions in color physiology can be answered, which so far were not accessible to scientific analysis, *e. g.*, the peculiarities in the selection of colors by senescent artists, and how they can be corrected with properly selected blue glasses.

The interesting essay deserves a closer study. C. Z.

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THE HUMAN EYE. — DI BRAZZA, F. SAVORGNA (Scientific American Supplement, May 1, 1909). In 1862, Noyes, a French oculist, was the first to succeed in getting photographs of the back of the eye, but they were poor specimens. The first real photograph was obtained in 1887 by Prof. Hove, of Buffalo University, but this was a very imperfect picture. Prof. Guloff in 1891, obtained a really clear photograph of the retina, although with some discomfort to the patient. The writer mentions several others who attempted to photograph the back of the eye and says the credit of having discovered a machine which is both practical and simple in construction and working, belongs to the Doctors Bonacini and Borghi, of Modena, who, in 1898, presented to the Surgical Society of Modena three splendid photographs, taken with their apparatus, of the back of the eye. The construction is as follows: The source of light has its rays reflected by a mirror; they then pass on to illuminate the back of the eye through the plano-convex lens. The image given through the convex lens can be seen very clearly by means of the ophthalmic mirror, and can be photographed with an ordinary camera. In the instrument of Bonacini and Borghi the source of light is really composed of two distinct parts, one for inactive light which, as everyone knows, does not injure the eye and by the light of which the eye is focused, while the second part gives much more vivid light, and is used only at the moment of taking the photograph. This is done by means of an appropriate stop. Prof. Walter Thomas, in 1902, invented a special ophthalmoscope by means of which the eye could be studied and photographed at the same time. Quite recently Dr. F. Dimmer, of Graz, has constructed an apparatus which may be said to be perfection, and with it numerous very clear and valuable photographs have been taken, the exposures never lasting longer than the twentieth of a second. The experiments of several American

scientists based on the production of *retinal currents* by means of rays of light, are given and one conclusion stated is "that the intensity of these currents produced in succession diminishes in exactly the same way as the change which takes place in muscular fatigue."

M. D. S.

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THE EYES OF ANIMALS.—COLLINS, PERCY (*Scientific American*, April 17, 1909), emphasizes the benefit that would accrue to science from a thorough and systematized knowledge of eye-anatomy among the lower orders of animals. In 1892 Mr. Arthur W. Head, of London, commenced to study and delineate the eyes of mammals, birds, reptiles and fishes. He has already made finished drawings, by the erect method, of some 250 mammals and reptiles, and these include at least one example of the normal eye of every order, *Cetacea* (*i. e.*, the whale kind) alone excepted. In addition to this, Mr. Head has actually completed drawings of a large number of birds' eyes, these forming the foundation of the vast collection which, it is hoped, will ultimately be completed and supply the key to bird-classification on truly scientific lines. Apart from his expenditure of unremitting labor upon his self-imposed task, Mr. Head's drawings have cost him nearly \$15,000 in cash to obtain. He is now working as an artist in collaboration with Dr. Casey A. Wood. Eventually, his completed series of drawings are to be published in colors, in the form of an atlas. Many interesting facts pointed out by Mr. Head and Dr. Wood are mentioned, and the *fundi oculi* of some birds, reptiles and animals described and compared with the diseased human fundus.

M. D. S.

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### REFRACTION AND ACCOMMODATION.

TRANSIENT HYPERMETROPIA IN DIABETES.—KNAPP, PAUL. Basel (*Zeitschrift für Augenheil.*, xxi., p. 420). The occurrence of myopia in diabetes, due to increased refraction of the lens, is proven beyond doubt by numerous examples, while there are only 9 instances of transient hypermetropia from diabetes. K. discusses the whole question as to hypermetropia once more with abstracts of the clinical histories of these cases and reports two cases of his own.

The first was a woman, aged 47, in whom, in December, 1907, K. ascertained with the sciascope emmetropia and gave

her  $+1.25$  for presbyopia. On October 20th, 1908, the patient returned with the statement that from the beginning of 1908 she had transient diabetes and now 8 per cent sugar. A few days ago her sight failed rapidly, for distance and near by. K. found  $V = 1/vi.$  in each, with the sciascope Hypermetropia  $+2.00$ ,  $V$  with  $+2.00 = 2/iii$ ; with  $+4.00$  she read finest print at 30 cm. Ophthalmoscop.: slightly reddened discs. Under strict diet the urine, on November 9th, was free from sugar;  $V R 2/iii$ , with  $+1.00 = 1$ ;  $V L 2/iii$ , with  $+0.50 = 1$ , which corresponded with the sciascopic examination, and, on Nov. 23, the hypermetropia was reduced  $R.$  to  $+0.50$ ,  $L + 0.25$ . The patient remained permanently free from sugar. Feb. 2, 1909,  $V R = 1 H. 0.5$ , with  $+1.00$  Jaeger 1 at 25 cm.,  $V L = 1$ ,  $E.$ , with  $+1.00$  Jaeger 1 at 22 cm.

In the 2nd case, a man, aged 48, who always had seen well, the visual disturbances for far and near set in over night. Sciascopy revealed hypermetropia  $+1.00$   $V = 1/iii$ , with  $+1.25 = 2/iii$ , with  $+5.00$  Jaeger No. 1 at 20 cm. After four weeks treatment the sugar had disappeared, there was emmetropia,  $V = 1$ , with  $+1.00$  J. No. 1 at 35 cm.

All cases had in common; intense diabetes, which readily yielded to treatment, rapid improvement of vision, subsidence of hypermetropia with the disappearance of sugar. The rapid failure of sight speaks against loss of water, as in almost all cases the tension was normal, and for a change of refraction of the lens, and is in accordance with the rapid development of alterations in the lens, particularly cataract, in diabetes. Perhaps the epithelium of the lens is suddenly changed with subsequent interference with its regulatory influence. That the refraction may be increased, causing myopia, or decreased, causing hypermetropia, is analogous to the changes of refraction in incipient cataract. The hypermetropia was observed almost exclusively in patients beyond 47 years of age, when the manifest hypermetropia equals the total hypermetropia. This refutes the explanation of Schmidt-Rimpler, that a latent hypermetropia had become manifest from diabetic weakness of accommodation.

K. produced diabetes in rabbits by injections of phloridizin to obtain changes of refraction. His results, however, were not positive.

C. Z.

POST-DIPHTHERITIC PARALYSIS OF ACCOMMODATION.—HENDERSON, F. L., St. Louis (*Amer. Jour. Ophthalm.*, April, 1909). The writer gives the history of an example of post-diphtheritic paralysis occurring in a boy of twelve and then dilates upon the situation of the lesion, the manner in which the toxin of the Klebs-Loeffler bacillus causes this paralysis and the great frequency with which the ciliary muscle is attacked. His conclusions are, 1, the lesions seem to be in the terminal filaments in Müller's muscle. 2, This lesion seems to be an inflammatory neuritis. 3, the predisposing cause seems to be the excessive saturation of these non-isolated terminal filaments with the morbid blood, due to the arrangement in the vascular ciliary body. The exciting cause lies in the difficulty of resting this involuntary muscle and the fact that instead of attempting to rest it, it is subjected to unusual exercise. Finally, it seems wise when enforcing rest of all the other muscles of the body, to insure rest of the ciliary muscle by prohibiting all use of the eyes and keeping the child from school at least six weeks after convalescence begins. C. H. M.

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CYCLOPLEGIA.—HILL, ARTHUR J.—Canton, Ohio (*Ohio State Medical Journal*, May 15, 1909), mentions causes of paralysis of accommodation, as diphtheria, diabetes, ptomain poisoning, contusions of the eyeball, severe affections of the nervous system and intracranial lesions, such as meningitis, brain tumor and hemorrhage, mydriatic drugs in liniments, ointments, suppositories, and internal remedies. Reduction of or subnormal accommodation, occurs in the prodromal stage of glaucoma, sympathetic ophthalmia and even sympathetic irritation, and occasionally without any apparent reason. In determining the refraction the writer prefers scopolomin. It is nonirritating, cheaper and much more reliable than homatropin and the effect lasts but one day longer. In the discussion, instances are given where the prolonged use of atropin was necessary to produce sufficient paralysis of accommodation to re-fract accurately. M. D. S.

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THE VISUAL ACUITY UNDER DEFINITE CONDITIONS IS AN INDEX OF THE STRENGTH OF THE NECESSARY SPHERIC LENS (PLUS OR MINUS), WHICH WILL GIVE A VISION OF 6 VI. OR MORE. THORINGTON, J., Philadelphia (*Ann. Ophthalm.*, July,



1909). The author finds that an eye with visual acuity of 6 vi. which is free from astigmatism, or with the latter corrected, when under the full power of a cycloplegic, will only see the top letter (6/lx.) on a six meter card if the said eye has an hyperopia or myopia of 2.25 D. The test letters, each line, from the top to bottom of the card, will represent 1/10 less error of refraction, or 0.25 D. Thus an eye with hyperopia of 2.50 D. and no astigmatism and completely under a cycloplegic, will not be able to read 6/ lx., whereas an eye under the same conditions which can read 6/xxx. would be 2/10 less hypermetropic, and an eye which can read 6/xii. would only be one-half as hyperopic and so on down. The author considers this to be of value in that a quick estimate of the spherical error can be made, thus saving time in getting down to the fine adjustment.

M. B.

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### RETINA.

OPERATIVE TREATMENT OF SEPARATION OF THE RETINA. REPORTS OF CASES TREATED BY SCLERAL PUNCTURE. —ELLIS, E. K., Boston (*Archiv. Ophthalm.*, May, 1909, xxxviii, 268). reviews the literature of operative treatment of retinal detachment and concludes that "the treatment which gives the best results is simple puncture of the sclera and retina, evacuating the subretinal fluid, together with some vitreous, placing the patient flat in bed with both eyes bandaged for a period of at least ten days, and if deemed advisable employing daily subconjunctival injections of salt solution." The author reports two cases in which the above treatment was carried out. In case 1 the patient could count fingers at five feet. Four scleral punctures were made, at varying intervals, and the final result with correction, was 20/xl. vision, with visual field normal in size. This result remained unchanged two years later.

In case 2 vision was 10/cc. Final result, after treatment and scleral puncture, was 20/xxx. vision, with correction. The result was unchanged one year later.

W. R. M.

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HOLE AT THE MACULA—REPORT OF TWO CASES.—ZENTMAYER, W., Philadelphia (*Ann. Ophthalm.*, July, 1909). Both these cases presented the typical picture of the macula being at a lower level than the surrounding retina with well defined margins. The floors were a little darker than the surrounding

parts with a somewhat granular appearance. One case followed a blow on the eye from a piece of wood, causing hypemia and increased tension. The other gave no history of injury, but there was a scar on the forehead, said to have been received in childhood.

M. B.

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### SINUSES, NOSE AND EAR.

TO THE DIFFERENTIAL DIAGNOSIS BETWEEN OCULAR HEADACHES AND THOSE CAUSED BY INFLAMMATIONS OF THE ACCESSORY SINUSES.—SNYDACKER, E. F., Chicago (*Klinische Monatsblätter für Augenheilkunde*, xlvii, June, 1909, p. 629). Out of 2,000 patients of S.'s private practice, 520 or 26 per cent. had diseases or injuries of the eye and its adnexus. 1,480 or 74 per cent. came for correction of real or supposed anomalies of refraction. 799 of these or 40 per cent. (of all) complained of headaches and it had to be determined, whether the headaches were due to errors of refraction or some other cause. In 55 cases or 7 per cent. S. found acute or chronic empyema of the accessory sinus, chiefly of the frontal sinus or combined empyema of the frontal or anterior ethmoidal sinus. In two others the diagnosis of empyema was ascertained later. From this S. concludes that in from 7 to 10 per cent. of the patients who consult the oculist for headaches, the headaches are due to acute or chronic inflammations of the accessory sinus.

He then discusses in detail the characteristic differential symptoms, which are summed up as follows: Headaches caused by inflammations of the accessory sinus are unilateral, neuralgic, come suddenly and violently with regular relapses, accompanied by pyorrhea from the nose or in polypoid or hypertrophic changes, or are caused by a violent attack of influenza or coryza, or are combined with sensitiveness at the frontal or maxillary sinus. They are relieved by application of adrenalin to the nose. The presence of pus is proved by Raentgen rays. S. therefore advises a careful rhinological examination of the nose in all cases of headache.

C. Z.

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THE OCULAR COMPLICATIONS OF NASAL SINUS DISEASE.—KNAPP, ARNOLD (*American Journal of the Medical Sciences*, July, 1909), says inflammation of the sinuses is associated with external or orbital inflammatory signs whenever the inflammation invades the intervening bony wall. If there is an active

involvement of the bone producing a discoloration or circumscribed defect in the floor of the frontal sinus or at the ethmoidal os planum, a subperiosteal abscess is formed which either remains encapsulated or extends forward, perforating the skin of the eyelid. There may be a slight venous congestion of the optic disc. If the orbital periosteum is invaded, involvement of the orbital structures results, cellulitis or abscess. The optical nerve becomes inflamed and the ophthalmoscope changes at the nerve head may be more pronounced on the nasal side. The writer believes disease of the antrum itself rarely causes an orbital complication unless through the intermediation of the ethmoidal cells. The recent investigations of Onodi have shown that the optic nerve frequently is in close relation to the posterior ethmoidal cells and that the extreme thinness of the intervening wall makes the involvement more likely than in the case of the sphenoid. It is of especial interest that the optic nerve is involved in the form known as retrobulbar neuritis in which a central scotoma is the characteristic functional defect. The optic nerve shows in the beginning no ophthalmoscopic changes unless the nasal infection is situated in the anterior ethmoidal cells. The prognosis in these cases is excellent. Ocular paralyses are not infrequently the only manifestations of orbital complications. Neuralgia, especially ciliary and retrobulbar, is frequently due to sinus affections, and asthenopia is a common symptom. The author discusses the possible etiological relation of iridochorioiditis, glaucoma and detachment of the retina to sinus disease. M. D. S.

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REPORT OF A CASE OF UNILATERAL RETROBULBAR NEURITIS DUE TO ETHMOIDITIS WITH RESTORATION OF VISION.—KRAUSS, FREDERICK, Philadelphia (*Ophthalmic Record*, May, 1909). A woman of 25 years had symptoms of monocular retrobulbar neuritis on the right side, with the characteristic central scotoma. The right pupil was slightly dilated. There was tenderness on pressure over the right upper inner orbital wall, also when the globe was forced back into the orbit. She complained of pain in this region, which was increased by sudden movements and by stooping. The septum was found deviated to the right and the middle turbinated region much encroached upon. The septum was straightened, the middle turbinated body removed and some of the anterior and posterior ethmoidal cells were

removed. Within a very short time all the ocular symptoms disappeared under Roentgen rays. S. therefore advises a careful rhinological examination. M. B.

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### TOXICOLOGY.

EXPERIMENTAL INVESTIGATIONS ON THE ACTION OF POISONS ON THE LENS. — KUWABARA, T., Matama Bungo, Japan (*From the eye clinic of Prof. P. Roemer, in the University of Greifswald. Archiv. für Augenheilkunde*, 63, 1909, p. 121), studied in test tubes the effect of substances, alien to the body, on the lens, using as criterion eventual opacities, detachment of the capsule, and effusion of albumin. The lenses being carefully weighed, were placed into the solutions of the substances of 1:10000, 1:1000, 1:100 in 0.95 per cent. salt solutions, for from 5 to 20 hours, then dried with blotting paper and again weighed. Lenses, which for control, were placed into 0.95 per cent. salt solutions, for the same length of time, showed neither macroscopic changes nor effusion of albumin.

The greatest changes were produced by inorganic and organic acids, and of these especially by tartaric acid, then by hydrate of potash. The sodium salts of these acids were in general indifferent, but hypertonic solutions caused opacities by absorption of water from the lens.

Iodide of potash, which by some authors has been recommended in incipient cataract, was perfectly indifferent. Perhaps it may diffuse into the lens, and gradually disappear from it. K. doubts that it influences the metabolism of the diseased lens. The lens is permeable for organic, not anorganic, salts of ammonium which therefore are poisonous for the lens.

The details of the numerous laborious experiments are arranged in tabular form. K. thinks that in the etiology of senile cataract only such poisons are to be considered which, like tartaric acid, increase, from the start, the weight of the lens without previous diminution of weight. Most authors coincide, that in senile cataract an increase, not decrease, of weight is noticeable from the beginning.

K.'s investigations show that products of the human metabolism, *e. g.* carbonate and carbamate of ammonium may be great dilution injure the lens. Likewise in anomalies of metabolism, as diabetes, substances are encountered (Beta-Oxybutyric acid, acet-acetic acid, their ammonium salts, etc.).

which possess an analogous influence on the lens. The experiments tend to support the hypothesis of Roemer of the etiology of certain forms of cataract, mainly diabetic and senile.

C. Z.

### TRACHOMA.

THE MORBID AGENTS OF TRACHOMA. HALBERSTAEDTER, L., Berlin, and VON PROWAZEK, S., Hamburg (*Deutsche Med. Woch.*, 1909, No. 17, p. 764), show how by the recent publications of Greeff (reviewed in the last number of *Ophthalmology*), their priority in the discovery of the epithelial inclosures in trachoma, published two years previously and acknowledged by Greeff in his former essays, might be infringed, and therefore lay down the facts once more.

C. Z.

PRELIMINARY NOTE ON THE FINDING IN CUBA OF THE BODIES DESCRIBED BY GREEFF AS THE CAUSATIVE AGENT OF TRACHOMA. FINLAY, C. A., and CARTAYA, J. F., Havana, Cuba (*Bulletin of the Health and Charities Department of Cuba*, May, 1909). The writer gives the history of the discovery of the pathogenic organisms supposed to be identified with trachoma by Greeff and by Prowasek and Halberstaedter. The bodies are found in all the cells of the trachoma follicles and exceptionally also as extra-cellular bodies; they group in pairs and present an oval outline. Greeff's description of the cycle of the parasite is given: "at first it appears in the shape of small, well-stained granulations, grouped in pairs, within the cell protoplasm, and surrounded by a clear zone; later, near the nucleus some reaction products appear; later on a conglomerate mass is formed, surrounded by the clear zone, close to the cell nucleus. The mass grows larger and larger, the clear zone gradually disappears, until the whole of the protoplasm is invaded; the cell then ruptures and the granules are set free."

In ten cases of typical trachoma the writers found all the forms described by Greeff. The number of bodies was small in a mild case. The bodies were formed in the epithelial cells, in the leucocytes in the striking corpuscular cells concerning the nature of which so much has been said, in cellular detritus evidently proceeding from these cells, and free among the cells. In most of the cases the material was obtained by expression of the follicles, but good results were obtained from surface preparations. They are best observed in epithelial and epithelioid cells.

C. H. M.

**TUMORS.**

FIBROMATOUS HYPERTROPHY OF THE PALPEBRAL MARGIN.—  
KALT (*Annales d'Oculistique*, March, 1909).

Kalt reports a case in which there was a small tumor at the margin of each upper lid composed of a mass of connective tissue bundles which had become hyaline and were passing into an amyloid condition.

He classifies them as cheloids.

G. C. H.

## ***Book Reviews***

**Manual of Ophthalmic Operations.**—Maynard, F. P., M. B. (Durh. D. P. H. (Camb.), F. R. C. S. (Eng.), Lieutenant-Colonel Indian Medical Service, Professor of Ophthalmic Surgery Medical College, and Ophthalmic Surgeon Medical College Hospital, Calcutta; Surgeon-Superintendent, Mayo Native Hospital, Calcutta; Fellow of the University of Calcutta. Calcutta: Thacker, Spink & Co. 1908.

The editor reviewed this work some months ago, but to his regret the copy was lost by the printer. The little book of 223 pages is, however, so valuable that even at this late day it should be brought to the attention of American and English eye surgeons. Col. Maynard has had a most extensive experience and has given us a work of value, especially as his descriptions bear the stamp of personal experience with everything that is therein. Thus the author has confined his descriptions to the operations that have been most successful in his hands, especially as regards cataract, that of both the intracapsular and the expression operations are most complete. Actual photographs, nearly life size, of the operations in their various stages enhance the value of the book. Some descriptions will be noted as peculiar to the Indian and English methods of operating, in many cases due to their habit of operating behind the head of the patient. The designation of incisions through the cornea by the direction of the clock dial is unique to us, but doubtless of benefit to the East Indian student. The book is thoroughly up-to-date, although it might be enlarged with benefit.

H. V. WÜRDEMANN.

**The Ophthalmic Year Book, Vol. VI.:** Containing a Digest of the Literature of Ophthalmology with Index of Publications for the Year 1908. By Edward Jackson, A. M., M. D., Professor of Ophthalmology in the University of Colorado; George E. de Schweinitz, A. M., M. D., Professor of Ophthalmology in the University of Pennsylvania; Theodore B. Schneideman, A. M., M. D., Professor of Ophthalmology in the Philadelphia Polyclinic. The Herrick Book and Stationery Company, Denver, Colo. 1909.

We again have the pleasure of welcoming the Ophthalmic Year Book, a most valuable commentary on the progress of ophthalmology for the past year. The short reviews are editorially expressed, being valued not according to the author, but as seen by the editors. In addition to these abstracts of medical



literature will be found biographical notices of prominent eye surgeons who have passed to the Great Beyond during the last year.

H. V. WURDEMAN.

**Injuries of the Eye, with Reference to Accident Insurance.**—Waggenmann, A., Professor, Jena. Graefe-Saemisch, Handbuch der gesamten Augenheilkunde. Second, entirely new, edition, Nos. 178 to 182, page 401 to 800, with 25 figures in the text. Leipzig: Wilhelm Engelmann. 1909. Subscription 10 m., \$2.50.

With regard to the general scope of this important work we beg to refer to our review of the first part in *Ophthalmology*, July, 1908, p. 791. In the present number the contusions of lids, conjunctiva, lacrimal organs and the eyeball, and their consequences are discussed; dialysis of the iris, aniridia, iridderemia, lacerations of the sphincter, inversion of the iris, mydriasis and miosis. The changes of the lens, following contusions of the eyeball, are considered under opacities, i. e. cataract due to contusion, stretching, relaxation, tearing of the zonula with subsequent more or less complete dislocations of the lens, with or without formation of cataract; then the changes of the ciliary body and vitreous, spasm and paralysis of accommodation.

Traumatic myopia after contusions is attributed to spasm of accommodation or relaxation of the zonula or dislocation of the lens.

Contusion of the eyeball may be complicated by glaucoma, not only in individuals predisposed to glaucoma. As increase of tension may be promoted by instillation of atropin, its application is not without danger, especially if the aqueous is hazy.

The next chapters deal with various changes of the chorioid and retina, as ruptures, detachment, changes of the blood vessels, ischemia, hemorrhages, formation of aneurysms, thrombosis of the central vein, commotion of the retina, amblyopia from contusion. From his well-known experimental researches on the interruption of circulation in the retinal and chorioidal vessels, W. considers the traumatic opacity of the retina as edema, caused by transudation from paralysis of the chorioidal and retinal vessels. The transudation from the chorioidal vessels certainly plays the chief part, and the fluid diffuses into the retina. In contusion amblyopia one has to think first of disturbances of circulation and paralysis from pressure on the nervous parts.

In the paragraph on belated detachment of the retina after contusions, W. reports a case, as illustration for the observation that detachment of the retina may occur after several months, in an emmetropic eye after rapid healing of a primary sequel to contusion, lacking visible changes of the vitreous.

In the next sections follow the contusions of the eyeball with rupture of the sclera and cornea, the injuries of the orbit, with special consideration of emphysema, traumatic enophthalmus, dislocation and avulsion of the eyeball, fractures of the orbital bones, injuries of the soft parts of the orbit, damage to the visual organ after injuries of the skull by blunt objects, fracture of the base of the skull, secondary alterations of the optic nerve and path of the ocular, fifth and facial nerves after injuries of the skull.

Also in this part the same excellent features are displayed which we mentioned of the first part. It is a most exhaustive work, with thorough utilization of literature, which will give the best possible information on these important topics.

C. ZIMMERMANN.

**The Non Medicinal Therapy of Eye Diseases.**—Hertel, E., Professor, Jena. Graefe-Saemisch, Handbuch der gesamten Augenheilkunde. Second, entirely new, edition. Nos. 176 and 177. 160 pp., with 54 figures in the text. Leipzig: Wilhelm Engelmann. 1909. Subscription 4 m., \$1.00.

The non-medicinal therapy of eye diseases comprises, besides the operations and fitting of spectacles which have been treated in other special chapters by Snellen, Landolt, Axenfeld, and Oppenheimer, the physical curative methods, the subconjunctival injections and the serum therapy. The subject matter of the present numbers is divided into thermotherapy, balneo- and climatotherapy, electrotherapy and light-therapy.

First the local application of heat and cold on the eye are presented, viz., the changes on the eye by different temperatures, inferring from them the general indications for the employment of heat and cold, the technic of application and their ployment, as thermophores, Leiter's Coils, etc., eyebaths, irrigations and douches, the indication for the local thermotherapeutic treatment of various eye diseases, as taught by practice; then the general applications of heat and cold, their effects on the eye, technic and apparatus, indication for the general application of heat and cold.

According to the same plan the other sections are treated. H. believes that the contradicting views on the efficacy of electricity in ocular palsies are perhaps due to the lack of opportunity to determine more exactly the character of a paralysis from degenerative reaction, but that it ought to be applied even if it does not accomplish more than to preserve the function of the muscles by exercising their fibers. The greater effect of the faradic current for the relief of pain according to von Reuss is mentioned, but with regard to electrotherapy in diseases of the optic nerve the opinion of Nagel, of 1871, is still maintained, viz., "the healing of those amauroses and amblyopias that are due to pathologic conditions of the nervous portion of the visual organ, is a weak point in the achievements of ophthalmiatry of today." However, if any kind of treatment in these cases is instituted at all, electrotherapy, on account of its great suggestive value, ought not to be given the last place.

Under light therapy the chemical and thermic actions of the rays are discussed, the employment of ultraviolet rays, with description and illustration of the carbon arc lamp, of Finsen-Reyn, the iron arc lamp of Strebel, the quartz lamp, uvial lamp, cadmium zinc lamp, and the indications of local light therapy.

According to the experiences made at the clinic of Jena, the chief advantage of light therapy in ulcers of the cornea over cauterization lies in the better functional results. The scars are smaller and thinner and such dense difforming leucomas never follow as after cauterization. Then the light baths and the blessings of discarding the so-called cures in the dark room are dwelt upon. As protective glasses are recommended: neutral black, Fieuzal and Enixanthos, glasses.

Finally the therapy with Roentgen rays and radium is discussed. In general H. warns against the employment of radium on the eyeball, as long as the degree and extent of action, especially into the depth, are not sufficiently ascertained.

Hertel's elaborate work will prove of especial value, as it treats in connection, with good judgment gained from personal experience, subjects of the greatest practical importance which are not found in the text-books. Thus again, the unceasing efforts of the editor to make the great handbook as complete and many sided as possible, are splendidly illustrated also by this new addition.

C. ZIMMERMANN.

**The Eyeclinic at Leipzig, at the 500th Anniversary of the University.** "Die Heilanstalt für Augenkranke Stiftung bei der Universität Leipzig, zur Zeit des 500 jährigen Bestehens der Universität Leipzig, 1909. Mit einem Rückblick auf Entstehung und Entwicklung der Anstalt." Rurack, Philipp. 64 pages, with portraits of Prof. Ph. Ritterich, Th. Ruete, E. A. C. Coccius and H. Sattler, and two pictures of the clinic. Leipzig: Wilhelm Engelmann. 1909. 1.00 M. \$0.30.

In this interesting report, taken from the twenty-fifth report of Ritterich and the fiftieth of Coccius, R. relates the history of the hospital and the clinic from its foundation as a charitable institution with four beds, by Ritterich in 1810, up to 1908, with 12,000 patients, treated in the polyclinic, and 1,585 in the hospital. In 1891 the association for maintaining the hospital for the poor was dissolved and the administration passed into the hands of the government under the name: Heilanstalt für Augenkranke in Leipzig, Stiftung bei der Universität. The brief biographies of the directors, who also were professors of ophthalmology at the University, Ritterich, Ruete, Coccius, and the present director, H. Sattler, a list of their assistants, and a description of the contributions, legacies and endowments are of great interest.

C. ZIMMERMANN.

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In view of the near approach of the season when biological therapeutics will claim a considerable share of the attention of practitioners, reference may pertinently be made at this time to a unique and valuable contribution to the subject which has recently issued from the press of Messrs. Parke, Davis & Co. The publication consists of 52 pages, exclusive of the cover, and appears in brochure form. It is handsomely printed on white enamel paper of first quality and bears in colors a profusion of half-tone illustrations. The title is "Serums and Vaccines." A brief chapter on the origin and development of biological therapeutics, with an interjected hint as to what the opsonins may have in store for us, constitutes the introduction. Then follow chapters on serums—antidiphtheric, antitetanic, antistreptococcic, antigonococcic, antitubercle and antivenomous; on tuberculins; on vaccines, including the new bacterial vaccines which are exacting so much attention from the medical world; on organo-therapy, its development, and some of the important products that are associated with it—"a tabulation," in the language of the brochure itself, "of such creations of biologic pharmacy as are really utilizable in medicine." There are striking pictures of the Company's home laboratories at Detroit, with numerous interior views; the research laboratory; the operating house and biological stables at Parkedale Farm (where the animals are cared for), with accompanying landscapes in nature's colors.

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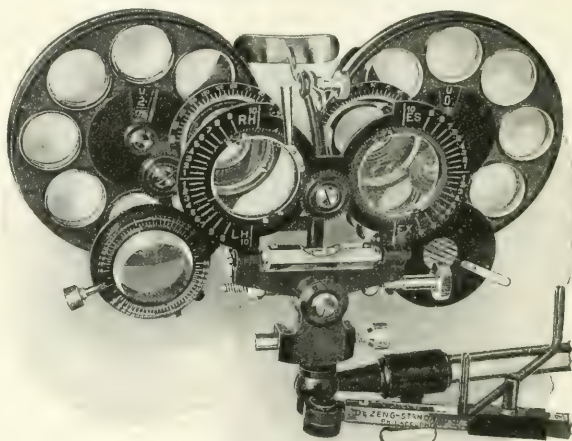
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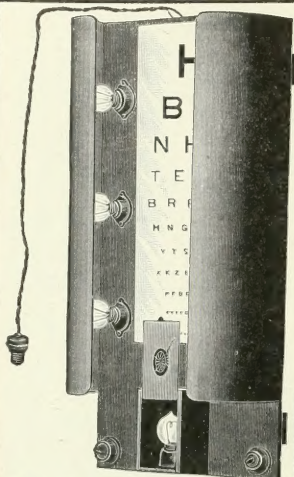
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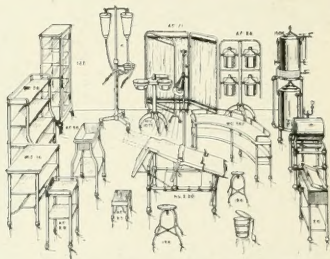
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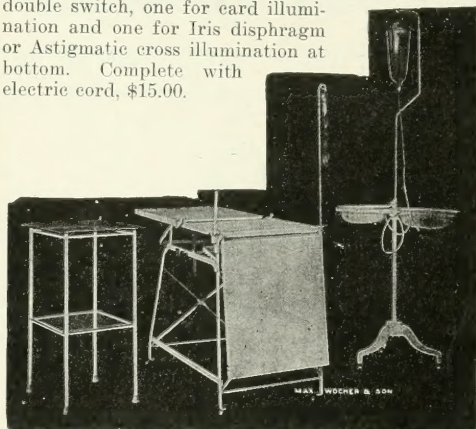
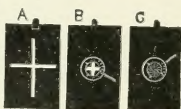




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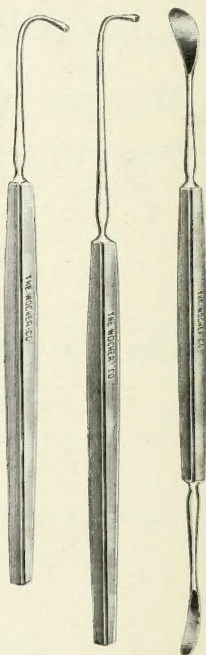


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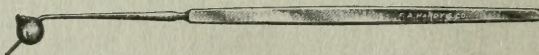
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